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Edited by

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ANNUAL MEETING

14 December 1940

THIS year it was again impossible to hold an Autumn Foray. The decision to choose some place where the collecting grounds were sufficiently near to headquarters to avoid the need for transport could not be carried out because the obvious areas were closed to the public. Moreover, about the time arrangements had to be made, an intensive air attack on this country was in progress, and London was having what is popularly called a 'blitz'. As this was more or less continuous, many members were either unable to leave London, or did not wish to do so.

In announcing the postponement of the Annual Meeting to members it was stated that an informal foray would be held at Baslow if sufficient were able to attend; conditions of travel were so difficult, however, that the few wishing to carry on were unable to face a cross-country journey.

The Annual Meeting was held in the rooms of the Linnean Society of London, Burlington House, Piccadilly, on Saturday, 14 December 1940, at 12 noon, the President, Dr H. Wormald, in the chair.

The Treasurer commented on the present satisfactory condition of the Society's financial position.

Mr W. C. Moore was elected President of the Society for 1941 on the recommendation of Council, the General Secretary paying tribute to the valuable work Mr Moore had done for the Society, and his continued interest in its affairs. Dr H. Wormald, Mr E. W. Mason and Mr T. Petch were elected Vice-Presidents. The other officers were re-elected. Messrs R. V. Harris, G. S. Hughes and N. C. Preston were elected members of Council in place of Dr G. R. Bisby, Mr W. P. Findlay and Miss E. F. Noel. The Plant Pathology Committee nominated Messrs W. Buddin, W. R. Day and Dr A. Smith as members of the Committee to replace Messrs W. C. Moore, N. C. Preston and G. Samuel.

In view of the uncertainties of events, it was agreed that no Autumn Foray should be arranged for 1941, but that one would be held if possible. If there is no Autumn Foray, the Annual Meeting will be held in December. Two meetings for the reading of papers were provisionally fixed for February and April, one to be held out of London. Dr E. O. Callen and Messrs F. C. Bawden, W. J. Keyworth and E. M. Long were elected members of the Society.

After lunch, the President, Dr H. Wormald, gave his address on 'Recent Research on Diseases of Fruit Trees and Bushes in Britain'.

The meeting ended shortly after three o'clock. There was no tea, for with the early 'black-out' and the prospect of a 'blitz' it was thought that most members would prefer not to dally. As was to be expected however, there was not a wild rush from the neighbourhood, and several members had tea in company, with plenty to discuss.

J. RAMSBOTTOM

RECEIPTS AND PAYMENTS FOR THE YEAR ENDING 30 JUNE 1940

1939	1940	£	s.	d.	1940	£	s.	d.			
1 July—Balance brought forward	...	...	638	17	11	30 June—Cambridge University Press, Cost of 450 vol. xxiii <i>Transactions</i> and Reprints ...	...	556	19	4	
30 June—Subscriptions to date	...	...	...	...	...	Postage, Stationery, etc.	...	...	...	...	
Gifts to Printing Fund	...	...	...	...	...	Treasurer	...	...	2	5	0
Sale of <i>Transactions</i> :	...	...	...	...	...	General Secretary	...	...	11	3	...
Current Vols.	...	...	...	...	...	Secretary	...	...	6	10	2
Back Vols.	...	...	...	...	...	Sec. Pathological Committee	...	...	4	1	9
Sale of Reprints	...	...	...	...	...	Editors	...	...	1	16	7
Profit from sale of C. Rea's <i>British Basidiomycetæ</i>	...	...	...	...	...	Sundry Printing	...	...	6	17	1
Deposit Interest	...	...	...	...	...	Fees of Meetings	...	...	5	11	9
War Loan Interest	...	...	...	...	...	Nomenclature Reprints	...	...	2	12	0
	...	...	...	...	...	Purchase of <i>Transactions</i>	...	...	1	0	0
	...	...	...	...	...	Balance in hand and on deposit	...	...	603	7	10
			£1191	12	9				£1191	12	9

CAPITAL ACCOUNT—Robinson Bequest, £50 }
 Cheesman Fund, £150 } invested in 3½ %
 Printing Fund, £300 } War Loan

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Examined and found correct, F. G. GOULD

PRESIDENTIAL ADDRESS

RECENT RESEARCH ON DISEASES OF FRUIT TREES
AND BUSHES IN BRITAIN

By H. WORMALD

IT is usual for the Presidential Address to be delivered at the Annual Meeting arranged to coincide with the Autumn Foray. It is natural therefore that the attendance at that meeting should show a preponderance of systematists and field mycologists who perhaps are not particularly attracted by those economic aspects of the Society's activities that appeal to the plant pathologists. As last year, we are again constrained to have our Annual Meeting in London, yet I trust that the field mycologists and systematists are well represented here to-day, for I feel that my remarks will not seem so much like platitudes to them as they might to those plant pathologists who are already familiar with some of the diseases I propose to mention. The field mycologist roams the woods and the hillsides in search of the fungi that are his special interest. The range of the plant pathologist is usually far more limited, yet I hope to show that even in these more closely circumscribed areas he sometimes makes discoveries that rouse his enthusiasm as much as would the finding of an undescribed fungus in the hedgerow.

It must not be assumed that the plant pathologists are solely concerned with the economic aspects of their work. They are primarily botanists, and as such are interested in plants. Their work often leads them to a study of the interreactions of pairs of plants, each pair consisting of a host and the parasite attacking it; this study has the ultimate aim, it must be admitted, of suppressing the parasitic organism or rendering its ravages innocuous, even though botanically it may be of considerable interest. Though as naturalists they may have as much affection for the parasite as for its host, and as mycologists their interest may be biased in favour of the parasite, yet, as plant pathologists, they must use the knowledge, obtained from their observations and experiments, in attempts to eliminate the parasite.

Plant pathologists do not often have that special delight of the field mycologists who so frequently discover fungi not previously described or not recorded for a particular district. Their interests lie chiefly in the discovery of some new aspect of a disease—in adding to our knowledge of the relation between host and parasite, possibly both already well known. They do not, however, despise the satisfaction

derived from discovering an organism not previously recorded, and sometimes in investigating a disease they find that the parasite has not before been described and so they are able to indulge in the pleasure of putting on record the discovery of an undescribed organism.

As most of my own observations on plant diseases have been made in the county of Kent, it is natural perhaps that my chief mycological interests have been in relation to diseases of fruit trees, and it is some aspects of these diseases that I would bring to your notice.

Most of our knowledge of the cause and control of fruit tree diseases in this country has been acquired during the last thirty years or so. Soon after the beginning of the present century E. S. Salmon (already renowned in the mycological world for his work on the Erysiphaceae) became attached to the Agricultural College at Wye in Kent, and it may be regarded that that event marks the beginning of an intensive investigation of fruit tree diseases in Britain that still continues. Before that time many of these diseases had already been noted by such keen mycologists as M. J. Berkeley, M. C. Cooke and George Massee, whose interests, however, were in the fungi causing the diseases rather than in the host plants, and no fundamental experimental work on the control of the diseases had been carried out.

When Salmon went to Wye two diseases—Apple Scab and American Gooseberry Mildew—were causing great losses in the Kentish orchards, so he made a special study of the life-histories and habits of the fungi concerned, and of measures for reducing losses due to their attack. He instructed growers in the preparation and application of Bordeaux mixture, and demonstrated the value of lime sulphur for use against fungous diseases, particularly Apple Scab and the powdery mildews.

In 1911 I had the good fortune to become associated with Professor Salmon and to co-operate in his work, and I owe my interest in fruit diseases to the inspiration of his personality, his wide botanical knowledge, and his more intimate mycological enthusiasm. Round about that time a blossom wilt disease was causing destruction on certain Kentish fruit farms. It was assumed to be caused by *Monilia fructigena*, but preliminary observations showed that the parasite was the related species *M. cinerea*. This discovery roused my own interest in the Brown Rot fungi and the diseases they cause. Other workers too found them an interesting group, and since that time a more intimate knowledge of these fungi—their relationship, mode of parasitism, and control—has been acquired by mycologists in this country and abroad.

After the last war the scientific study of fruit-growing began to receive more serious consideration, largely as a result of a movement by the fruit-growers themselves for an investigation into some of their own particular problems. The Long Ashton Research Station in-

creased its personnel and activities, and the East Malling Research Station, founded in 1913 as an offshoot from the Agricultural College at Wye, rapidly added to its acreage, its laboratories and its staff. As pomology became a more exact science a more intensive study was undertaken of the pests and diseases of fruit trees, not only at those two fruit research stations but also at other institutions. F. T. Brooks (1911, 1913) and his pupils investigated, among other diseases, Silver Leaf, and most of our knowledge of this disease and measures for controlling it we owe to the work carried out under his direction at Cambridge, while, at the John Innes Institution, Miss Cayley made a study of Apple Canker and of Die Back of plum trees. Certain fruit diseases have been investigated in Scotland, Northern Ireland and in Eire, while research on diseases affecting stored fruit has been carried out at the Low Temperature Station at Cambridge and its substation, the Ditton Laboratories, and also at the Imperial College. Thus in the last twenty years or so very much information has accumulated relating to the various diseases to which our fruit crops are subject.

It is impossible in the time at my disposal to review all the fruit diseases that have come under investigation during that period, so I will confine my remarks to a few that have received special notice because of their importance to the fruit-growing industry, or because they illustrate some particular line of research.

Attention has been directed more and more to the physiological processes underlying the infection by parasites, and efforts have been made to determine whether by judicious treatment fruit plants can be made more resistant to disease. All diseases are a result of the derangement of the normal physiological processes, and although it is sometimes convenient to refer to certain disorders as 'physiological' or 'functional' diseases, all we mean is that they are brought about by unfavourable environmental conditions and are not a direct result of an invasion by any parasitic organism or infective virus. It is sometimes impossible to distinguish clearly between physiological and infective diseases, since the physiological condition of the host plant often determines whether or not that plant is conducive to infection by a particular parasite.

Of these so-called 'physiological' diseases one of the most widespread and important in fruit trees is that known as Leaf Scorch. At one time this was suspected to be a result of infection, but Wallace (1927, 1928, 1929) at Long Ashton proved conclusively that this disorder, of apple trees particularly, but found also on currants and gooseberries, is a direct result of lack of potash. This discovery revolutionized manurial treatment in orchards, for it was found that in many of them there was a serious lack of potassium salts, a lack which was not compensated for by the heavy dressings of nitrogenous manures sometimes applied, but only aggravated by such treatment.

On manurial trial plots of apples at East Malling a shortage of potash has been associated not only with Leaf Scorch but also with the appearance of so-called 'ghost flowers' (blossoms paler than normal and evidently unhealthy), followed by a dying back of the branches.

Such 'deficiency diseases' have received great attention in recent years and have led to an investigation of methods for detecting mineral deficiencies in plants. Methods elaborated by Roach (1938) are based on the injection of mineral salts in solution into those plants, which, because of their symptoms, are suspected to be lacking in certain elements; he has shown that not only trees or branches, but individual shoots, leaves, or even parts of leaves can be injected. In this way response to a particular treatment may show within a few days; the nature of the deficiency can thus be diagnosed quickly and steps taken to remedy it. More recently still spectrochemical methods of detecting mineral deficiencies in fruit trees have been employed by Roach (1940) and Thompson (1940) and are yielding most promising results. When these methods of detecting deficiencies become more widely practised there is every hope that functional and deficiency disorders will be more readily recognized and that manures and fertilizers will be applied in a far less haphazard fashion than in the past.

That injection methods may have some therapeutic value has long been recognized, especially in relation to the use of iron salts for chlorosis, and there is some evidence that injection may aid affected plum trees to recover from Silver Leaf. Certain results suggest that injection may sometimes have a prophylactic action also. Thus in one of Roach's experiments not only did injection induce a recovery from chlorosis but the leaves on treated branches were found to be more resistant to frost injury; in another experiment apple trees injected with sodium thiosulphate showed less mildew than untreated trees. Whether such methods of protection against diseases will ever be introduced in practical fruit-growing must be left an open question at present.

To turn to diseases with a more mycological interest we find that here again, with a wider outlook, the plant pathologist is no longer content with merely identifying a fungus and then prescribing 'grubbing up and burning' or spraying with Bordeaux mixture. More attention has been given to the reaction of the host plant and to means of enabling it to resist attack. Mention has already been made of Silver Leaf; it is one of the most destructive diseases of plum trees, but it affects other varieties of fruit trees, and may cause serious loss in top-grafted apple trees. Measures directed against this disease as a result of Brooks's work consist not only in committing seriously infected trees or branches to the flames, but in manurial treatment in an endeavour to induce such trees as are already showing Silver

Leaf, but not too far advanced, to throw off the disease (Brooks and Brenchley, 1931), and in protecting open wounds at those periods of the year when the trees are most liable to attack, for experiments showed that exposed tissues are resistant to attack during the summer months but liable to infection at other times of the year (Brooks and Moore, 1926). It was also found that the percentage of recoveries from Silver Leaf in the Victoria plum varied with the variety of rootstock on which the trees were worked. With regard to Silver Leaf Canker in top-grafted apple trees there is evidence from observations at East Malling that this can be avoided largely by adopting 'framework grafting' in place of the customary top-grafting. In frameworking there are no large wounds and there is probably less physiological disturbance to the trees since the main branches are retained, and the trees become well provided with foliage again within a comparatively short time.

Common canker of apple and pear trees has been investigated by a number of workers with the object of obtaining improved means for controlling the disease. Miss Cayley (1921) studied its life-history and cytology, and incidentally found that the apple canker fungus in Britain is not *Nectria ditissima*, as had been generally assumed, but *N. galligena*. Wiltshire (1921*b*) found that the fungus could infect through the leaf-scars and also through scab lesions. More recently, Marsh (1939) has shown that canker infection through leaf-scars may be initiated in October and April but not in November and January. In one of his experiments a Bordeaux-casein-oil spray, applied in April, resulted in fewer cankers on sprayed shoots than on those left unsprayed, thus suggesting that a spray applied at that time would reduce the chances of infection, although Munson (1939) found that the canker fungus discharges spores during wet periods at all times of the year. It has been shown that the canker fungus not only attacks the stems and branches but is associated with an Eye Rot of the fruit (Salmon and Wormald, 1915; Weston, 1927), and it is to be assumed therefore that the fructifications on the cankers serve as sources of infection for this eye-rot disease.

That the canker fungus is known to infect through scab lesions is important, since it can be inferred that measures directed against scab will indirectly help to prevent canker. This association of canker with scab lesions has been observed also on pear trees (Wormald, 1927), and emphasizes the importance of routine spraying against scab in controlling canker. The physiological relation between parasite and host has received some notice. Certain varieties of apples, not only among those for dessert and cooking but also cider varieties, are found to be more susceptible than others (Umpleby and Swarbrick, 1936), and observations at East Malling suggest that the susceptibility of the scion variety is influenced by the rootstock (Moore, 1934).

The disease that most of all has exercised the minds of horticulturists and the plant pathologists at the fruit research stations is Apple Scab. It is the most troublesome disease with which fruit growers have to contend, and thousands of pounds are spent every year in endeavours to keep it under reasonable control. The early work of Salmon, already mentioned, was continued and amplified by him and his colleagues. Salmon and Ware (1924) were the first to announce the occurrence in Britain of the perithecial stage of *Venturia inaequalis* on the fallen leaves, and of the overwintering of the fungus on the flower-bud scales (Salmon and Ware, 1931) and, in collaboration with the chemists Goodwin and Martin, they carried out extensive spraying trials on apple trees. Of particular notice in this connexion was their introduction of cotton-seed oil for use with Bordeaux mixture; by its means the percentage of copper could be reduced while the mixture still retained its fungicidal properties, with less risk of spray injury (Goodwin *et al.* 1935).

On the physiological aspects of the relation between the parasite and its host may be mentioned the work of Wiltshire (1915) who made a cytological examination of the penetration of the fungus into the host tissues, of Miss K. H. Johnstone (1931) who studied the spore germination and the penetration of the germ tube, and of Marsh and Walker (1932) who described the development of the pustules on the young shoots. Chief attention, however, has been directed to the improvement in the application of fungicides for the control of this disease.

Twenty years ago the recommendations for controlling scab included spraying the foliage and developing fruit with Bordeaux mixture or lime sulphur using a 'fine misty spray', and apparently these measures were tolerably successful, for there seem to have been few complaints of spray injury or of severe infection after such applications. The importance of the disease stimulated increased interest in control measures, and spraying trials were carried out at Wye by Salmon and his colleagues (Goodwin *et al.* 1935), at Long Ashton by Marsh (1931), at East Malling by Grubb (1921, 1924) and by M. H. Moore (1930, 1932, 1936), in East Anglia by Petherbridge *et al.* (1929) and in Northern Ireland by Muskett and Turner (1929). After the discovery that the fungus overwinters in this country on the leaves, and that the perithecia discharge their ascospores early in the spring, it was realized that early applications of fungicides are essential for effective control of scab. This was confirmed by the results of the spraying trials, Marsh (1931) particularly emphasizing the importance of two pre-blossom applications, and now it is customary to spray the trees at least twice before the flowers open—at the green-bud stage and the pink-bud stage.

These pre-blossom applications of the fungicide with at least two

others after the blossoming period, when considered in relation to the increased acreage under fruit and the attention now demanded by other crops on the modern fruit farm, created a difficulty in getting round in time with the fine misty spray, especially when the weather conditions about the blossoming period allowed little time between the green-bud stage and the pink-bud stage. Moreover, the introduction of the 'National Mark' scheme, and the more critical examination of fruit at shows, set a far higher standard for disease control.

These factors led to a consideration of means for more rapidly applying coarser sprays with higher pressures, and the elaboration of power spraying, so that sprays could be directed more effectively to the tops of tall trees. As a consequence there have been various improvements in the spraying machinery. The relative effectiveness of mobile and stationary spraying outfits have been considered by Swarbrick at Long Ashton, and by Turnbull (1939); the latter has shown, too, the value of multiple nozzles for rapid spraying, and he has made a special study of the costings of fruit-tree spraying. The various factors affecting the efficiency of spraying operations has been investigated by Davies (1940) at Wye.

The change from a fine misty spray to a coarser and more wetting spray led, however, to other difficulties. The higher pressures and the drenching sprays caused damage to foliage and fruit, and it was found necessary to modify those concentrations of the spray fluids formerly employed. Again to reduce the number of applications necessary for scab and for insect pests it was found desirable to use spray fluids containing both fungicide and insecticide. These combined sprays have been studied at Long Ashton (Kearns *et al.* 1936) and at East Malling (Moore and Montgomery, 1936).

Meanwhile, substitutes were sought for Bordeaux mixture and lime sulphur, since neither is an ideal spray for apple trees, for at a strength effective against the scab fungus they are likely to cause spray injury, especially on certain varieties. The ideal spray fluid has not yet been found, but commercial firms have introduced a number of proprietary fungicides, such as certain basic copper salts, to replace Bordeaux mixture, and various forms of sulphur, particularly sulphur dusts, 'colloidal' sulphur, and wettable sulphur.

From careful observations on plots with trees on various rootstocks and with different manurial treatments, M. H. Moore (1936) has found that the variety of rootstock and the manurial and cultural treatment of the soil affect not only the degree of susceptibility of the trees to infection by the scab fungus but also their susceptibility to spray injury, and this augurs a new outlook on means for the control of scab. The great problem in the control of diseases by spraying is of course to kill the parasite, or prevent its development, without injuring the host plant. In the apple the range of concentrations of

the active ingredient of the spray fluid within which it is effective without causing injury, is narrow, and varies with the different varieties of apple and with the fungicide employed. Moore's (1940) observations suggest that the range can be extended or diminished according to the conditions under which the trees are growing, and that it can be modified by cultural and manurial treatment. In this connexion recent experiments by Wallace (1939) led him to suggest that magnesium deficiency bears some relation to the susceptibility of apple foliage to spray injury. If these observations are confirmed by future experiments, and are put into practice, it will doubtless lead to a more successful control of Apple Scab.

There is evidence that susceptibility to injury from sulphur sprays in apples is a genetical factor. Tydeman (1941) has found that 21 % of the seedlings from very 'sulphur shy' parent varieties were sulphur shy, while those of sulphur-resistant parents were less than 2 %. These results hint at the possibility of breeding for resistance to spray injury, and should have some bearing on the Apple Scab problem.

In an endeavour to avoid empirical methods of assessing the value of newly introduced fungicides, by laborious and costly field experiments, preliminary laboratory methods of testing fungicides have been elaborated at Long Ashton (Marsh, 1936) and East Malling (Montgomery and Moore, 1938), chiefly with reference to the control of Apple Scab.

This disease then has been viewed from a number of angles, and various lines of research are being followed up. They are already yielding good results, and continued work along those lines should ensure that scab will become even less of a menace to our apple crop than at present.

I have already made a passing reference to the Brown Rot diseases. It may seem of no practical importance to know whether *Monilia fructigena* or *M. cinerea* is the cause of Blossom Wilt, but it must be realized that an exact knowledge of the host relationships of parasitic organisms is necessary in a consideration of the best means for controlling the diseases they cause. Up to 1912 the Brown Rot diseases in Britain had been assumed to be the result of infection by *M. fructigena*, whereas it was then found that both species were in our orchards, and that they could be distinguished by their morphology, their characters in pure culture, and their host relationships (Wormald, 1935 *a, b*).

Incidentally, a comparison of many strains, collected not only in Britain but also from abroad, led to the conclusion that the common Brown Rot fungus of America was different from either of the two prevalent in Europe. This conclusion apparently stimulated increased interest among American workers, who soon discovered that the American fungus which had gone under the name of *M. fructigena* and

then *M. cinerea* was really *Sclerotinia fructicola*, and now it is generally agreed that the three chief Brown Rot fungi are *S. fructigena* Aderh. & Ruhl. (*Monilia fructigena* Pers.), *S. laxa* Aderh. & Ruhl. (*Monilia cinerea* Bon.), and *S. fructicola* (Wint.) Rehm.

Again it may be asked, of what use are these distinctions from a practical point of view. The answer is that the distribution of the three fungi is not the same. *S. fructicola* occurs in North America, Australia and New Zealand, *S. laxa* in Europe and the North American states bordering on the Pacific Ocean, and *S. fructigena* is confined practically to Europe. This last is an important point since *S. fructigena* is very destructive to the pome fruits while *S. fructicola* causes comparatively little damage to either apples or pears. It is necessary therefore that a watch be kept on *S. fructigena* to see that it is not introduced into those countries (the United States, Australia and New Zealand) in which large quantities of apples are grown for exportation. Again, since *S. fructicola* has not yet become established in Europe reasonable precautions should be taken to see that it does not reach our stone-fruit orchards, for in those countries where it occurs it is particularly destructive to stone-fruits. It has reached these shores, on imported peaches, but up to the present it has not been recorded in our orchards.

The most serious form of Brown Rot infection in Britain is Blossom Wilt caused by *Monilia cinerea* on the apple and Morello cherry, for on these hosts it results not only in the destruction of the blossoms but also in the death of fruiting spurs and branches. A study of the habits and annual cycle of the fungus has enabled practical recommendations to be given to growers for the control of these diseases, which are now generally kept in check except in neglected orchards and gardens.

The first problem of the East Malling Research Station was the standardization of the 'Paradise' rootstocks for apple trees. This involved propagation by layering and stooling. The resulting one-year-old shoots are pulled or cut from the stool or layer and planted out, and later they are grafted with the scion varieties. By this method tissues are left exposed at the base of each shoot and frequently large galls arise there. These galls attracted attention, for it had been shown by Erwin F. Smith and Townsend that such galls were caused by a microbe named by them *Bacterium tumefaciens*, and Crown Gall was considered to be a serious disease. The work at East Malling was directed towards determining whether Crown Gall was really a menace to nursery stocks, and ascertaining the relative susceptibility of the various apple rootstocks under propagation. It appears doubtful, from our own observations, whether these galls do affect the vigour of apple trees to any noticeable extent, for on one plot on the Station trees were planted out, some with galls, others

without, and over a period of about twenty years no significant differences in their vigour or cropping has been detected. With regard to varietal susceptibility some evidence was obtained at East Malling that certain varieties of rootstocks did produce larger and more numerous galls than others (Wormald and Grubb, 1924; Harris, 1931). It should be pointed out that in America, apple varieties are commonly grafted on pieces of root (bench-grafting), and that galls frequently arise at the graft unions. It would seem that such galls, arising about ground level, are more serious than the basal galls of the Paradise apple rootstocks.

As Crown Gall on our own apple rootstocks appeared to be of little economic importance our interest in the disease waned somewhat, but many enquiries were received about it, and galls were found on a number of host plants, particularly raspberries and other species of *Rubus* on which, at times, the galls were evidently causing damage. Thus on cultivated blackberry plants large galls have been found which cause the canes to split into strips at the nodes, and sometimes the lateral branches are transformed into tumours. The work on Crown Gall was resumed therefore and further study was made of strains isolated from various hosts, and of the development of galls on apple stocks. In this connexion it was found by Harris and Pearse (1938) that not only could galls be induced on apple stems by a strain isolated from raspberry but that very similar galls could be caused by a growth-promoting substance.

During the investigations at East Malling, galls, resembling those described as caused by *Bacterium tumefaciens*, have been found on many different species of plants in this country, including, in addition to apple, pear, raspberry, blackberry and loganberry. It is uncertain, however, how many of these are of the Crown Gall type, that is, caused by *B. tumefaciens*. Organisms have been isolated from a number of such galls, and inoculation experiments have shown that some of them can induce tumours on certain host plants. Such strains are therefore probably to be included within the species *B. tumefaciens* although it has been found that their host relationships are not identical, and that they show marked differences in certain culture media.

On the more practical side attempts have been made to confirm results reported on the Continent that organic mercurial compounds aid in controlling Crown Gall on nursery fruit trees, and results in a positive direction, but as yet not very striking, have been obtained. In one experiment, however, the treatment induced a far better stand in the young trees than in the untreated controls; if this is confirmed in further experiments it may prove of value in nursery practice not only in controlling Crown Gall but also in accelerating rooting in nursery apple stocks.

Other bacterial diseases of fruit trees in Britain are really destructive. For many years fruit-growers have experienced great losses in their plum and cherry orchards from what was often referred to as Die Back. The cause of this die back was for a long time in dispute. From the symptoms it would appear that this disease is the one mentioned in the early reports from the Woburn Experimental Fruit Farm towards the end of last century; by different authorities it was then attributed to *Nectria ditissima*, *Micrococcus dendroporthes*, and *Eutypella prunastri*. Other fungi found on affected trees have been suspected of parasitic habits, and unfavourable soil conditions (particularly waterlogging) were also suggested as a cause of Die Back. Possibly some of these factors contribute to the die-back problem, but they do not offer a satisfactory explanation in most outbreaks. In 1920, Wiltshire (1921*a*), working at Long Ashton, found bacteria in lesions on die-back trees, but on his transference to another sphere of work he was unable to follow up this discovery.

In 1924 and 1925 many trees on the plum trial plots at the East Malling Research Station were dead or dying, and this gave an opportunity for studying the disease more closely, so affected trees were examined carefully during July and August when symptoms were showing clearly. The roots of such trees were quite healthy and had developed normally, thus suggesting that the soil conditions were not the direct cause of the trouble. The affected parts of the trees were found to be along the stem where there was usually a long lesion, sometimes two to three feet long, and often girdling the stem. The bark on such lesions bore fungi at that time of the year, and eight or nine different species were identified. At the region bordering on the healthy parts, however, the cortex contained numerous bacteria which pozed out in dense masses when the tissues were teased out in water. In order to find the relation that these organisms bore to the disease it was necessary to grow them in pure culture, and the usual attempts at isolation were made. They failed completely; even when thickly sown the organisms gave no growth. This suggested either that they did not readily submit to pure culture methods or that they were no longer viable. The latter alternative seemed the more likely and led to the natural assumption that they must have been alive earlier in the year. In 1926 therefore the plum plots were examined in spring for the first appearance of disease symptoms. As soon as stem lesions could be distinguished they were examined, and, as before, dense masses of bacteria oozed out, but now on plating out no difficulty was experienced in isolating and cultivating the organism during April, May and June. Later, however (July and August), attempts at isolation again failed, thus confirming the conclusion drawn in the previous year that the bacteria were present and alive in the affected trees in spring but that they perished during the summer.

The next step was to determine when infection of the stem occurs, so inoculations were made during successive months throughout the year, and it was found that infection during the late autumn and early winter produced the longest cankers and that inoculations in summer yielded no cankers at all. The question then arose: How do the bacteria survive the period between spring, when they are alive in the lesions, and autumn, when they enter other trees to cause further infection? On the same plots where Bacterial Canker was rife, trees, otherwise quite healthy, bore spotted leaves. When the spotted leaf tissues were teased out in water numerous bacteria oozed out. The organism was easily isolated, and in culture was indistinguishable from that found in the stem lesions; this suggested that the same organism could infect either stems or leaves, according to the season, and inoculation experiments carried out with the organism isolated from a leaf induced cankers on plum stems. The bacteria thus spend the winter in producing stem lesions, and in summer they cause leaf spots (Wormald, 1932). There is a similar disease of sweet cherry trees except that in cherries the individual branches are attacked more often than in plums (Wormald, 1937), and also that recently a blossom blight of cherries has been found with an organism in the affected tissues which is apparently the same as one that causes cankers.

What I wish to emphasize is that this so-called die-back is a good example of a disease where control measures depend so much on an exact knowledge of the cause and of the habits of the parasite. When it was thought that a fungus, *Eutypella* for instance, was responsible, all that could be recommended was the removal and burning of affected trees, and this was possible only when such trees could be easily recognized, that is, in summer. By that time, however, the actual parasite is no longer active, and probably dead, so that such measures are utterly useless as a means of control. The measures that are now being put to the test and yielding some success are based on the knowledge acquired of the habits, or seasonal cycle, of the parasite. These measures include spraying in spring and summer to check the leaf-spot phase, spraying in autumn to prevent stem infection, avoiding injuring the stems and branches at certain critical periods, and raising trees with resistant stems top-grafted with susceptible but more valuable scion varieties.

Other bacterial diseases of fruit trees that have come under observation are a blossom blight of pears and a blossom blight and leaf spot of acid cherries. The disease on pears was investigated at Long Ashton (Barker and Grove, 1914) and found to be caused by an organism which has been named *Bacterium Barkeri*. A similar disease of pear trees in the south-eastern counties is associated with two organisms which appear to be different from *B. Barkeri*, so that it

would seem that pear blossoms may be attacked by more than one bacterium. There is no evidence, however, that the Fire Blight organism of pears, so destructive in America, is present in Britain. In a blossom blight and leaf spot of acid cherries bacteria are present in the tissues and two different organisms have been isolated; sometimes one, sometimes the other is isolated under conditions suggesting they are parasites, but definite proof of their parasitism has not yet been obtained.

The bush fruits, including the strawberry, have received a good deal of attention in recent years, and their functional, fungal and virus diseases have been investigated. Among the functional disorders mention may be made of what has been called Dwarf Lateral Scorch of raspberries, the variety Lloyd George being notably susceptible. For long the cause of this disorder was obscure, though certain fungi occasionally found on the crown of severely affected plants came under suspicion. At one time it was thought to be due to winter frosts, until it was noticed that it was generally most severe after mild winters. Experiments carried out by Harris (1940*b*) offered some confirmation of the supposition that relatively high temperatures during the dormant season induce this disorder. The past winter with its excessively low temperatures over long periods provided a test case for the reliability of this conclusion; not a single example of Dwarf Lateral Scorch was to be found in our own raspberries at the East Malling Research Station, and no enquiries about it were received, although during 1939, after a fairly mild winter, it was very prevalent.

In the late spring of 1939 a disorder of strawberries aroused some interest because the discoloration of the foliage, as scattered reddish spots or marginal blotches, raised a suspicion that the trouble was Severe Crinkle, a virus disease. Field observations, however, suggested that it was the result of unfavourable cultural and weather conditions; it was mostly seen in plants that had been planted late the previous autumn and had produced comparatively few roots, so that during the rather dry weather of the following spring they were behaving more or less as xerophytes with stunted growth and excessive pigmentation of the foliage. Later, when conditions became more favourable, such plants recovered, thus showing that the disorder was of a functional nature and not a virus disease.

Of the fungal diseases of bush fruits American Gooseberry Mildew has been perhaps the most troublesome. It appeared in Great Britain early in the present century and within a few years was widespread and causing great destruction. Salmon tackled the problem and showed that the disease could be controlled by spraying the bushes with lime sulphur (Salmon and Wright, 1912; Salmon, 1913). It was found, however, that some of the favourite varieties were 'sulphur shy', so that lime sulphur could not be used on them without risk of

causing defoliation. Nattrass (1928), at Long Ashton, showed that this could be avoided by employing, instead of lime sulphur, a soda and soap solution, which, though not so effective as lime sulphur, could be used with some success, especially on the sulphur-shy varieties.

A vascular disease of raspberries receiving the name Blue Stripe Wilt, from the colour of the stripe which is often seen extending from ground-level upward along the young canes of diseased plants, was studied by Harris (1925). He found mycelium in the vascular tissues of affected canes, and the fungus when isolated in pure culture proved to conform to descriptions of *Verticillium Dahliae* Kleb.; in inoculation experiments with this fungus he was able to reproduce the disease, thus confirming its parasitism. These results led to an investigation of wilt diseases in other crop plants in Britain, and *V. Dahliae* was found in stems of Morello cherry, black currant, strawberry, and rhubarb, and in quince when propagated by layers as rootstocks for pears, while *V. albo-atrum*, already known to be the cause of wilting in potato and tomato plants in this country, was found to be associated with a serious disease of hop plants.

Cane Spot, with the associated Leaf Spot, of species of *Rubus* caused by *Elsinoe veneta* (Burkh.) Jenkins (*Gloeosporium venetum* Speg.), has received some attention at East Malling, latterly in relation to the loganberry. Measures successfully employed against the disease in raspberry were inadequate for the loganberry, and this was found to bear some relation to the fact that the seasonal cycle of the fungus, especially in the time of maturing and discharge of the ascospores, is different on the two host plants. Moreover, the orthodox methods of training the young canes in the loganberry were found to encourage infection. The application of a copper-containing spray checks the disease, but it has been shown that such measures are most effective when combined with suitably modified methods of training the canes. The fruiting canes are sources of infection, and the training should be such that as the young canes develop they are so placed in relation to the old canes that spores from the fungal fructifications on these canes do not get splashed by rain on to the young growth. Measures for the effective control of Cane Spot on the loganberry and other species of *Rubus* that produce long canes thus involves a consideration of methods of training which obviate infection in this way, and new methods with this end in view have been devised (Beakbane, 1939).

In strawberries various diseases caused by fungi have received some attention, in particular the root rots. Of these the so-called 'Lanarkshire Disease' or 'Red Core' has been responsible for widespread losses in certain strawberry-growing areas in Scotland. Mrs Alcock (1929) found that a species of *Phytophthora* was constantly associated with this disease, and more recently, Hickman (1940),

working at Westerham in Kent where an outbreak had occurred, succeeded in isolating the *Phytophthora* in pure culture, and obtained proof of its parasitism. The fungus proved to be one not previously described and has been named *P. Fragariae*.

The 'Black Root Rot' of strawberries was studied by G. H. Berkeley during a year spent in this country from Canada, and he and Miss Lauder-Thomson found associated with it a number of fungi, among them some that had been shown, or suspected, to be the cause of root rot in strawberries in America (Berkeley and Lauder-Thomson, 1934).

In the small fruits, certain serious diseases have been shown to be transmissible by grafting or by insect agency and are thus considered to be of virus origin. Of these, raspberry Mosaic, strawberry Yellow-edge and Crinkle, and Reversion in black currants threatened to cause great losses, but when their true nature was determined steps were taken to raise disease-free clones for propagation. Of these diseases perhaps the most interesting, as showing a genetical relation of the host plant to the intensity of the symptoms, is Yellow-edge of the strawberry, studied by Harris (1932, 1933) and Miss King (1939), particularly from an etiological point of view and the symptom expression of the strawberry varieties. The original parents of the cultivated varieties of strawberry are *Fragaria chiloensis* and *F. virginiana*. Both these species are susceptible to infection by the virus, but whereas the former suffers very little from the presence of the virus within its tissues, the latter becomes severely affected. Among the cultivated varieties there are some that approximate in appearance to *F. chiloensis* and these too tolerate the virus, while those which more nearly resemble *F. virginiana* are very susceptible and rapidly deteriorate when infected.

Other varieties form a series between the two extremes. Royal Sovereign is a variety which readily succumbs to Yellow-edge, and a Yellow-edge-free clonal strain of this variety was obtained and extensively propagated. It was found, however, that this selected clone contained the virus of Mild Crinkle, a disease which alone causes but little reduction of vigour and fruitfulness of the plants affected by it. Recently, however, there has been found in an isolated spot in western Ireland, a strain of Royal Sovereign free not only from Yellow-edge but also from Crinkle, and this strain is now being propagated in the hope that it may prove to be even more vigorous and prolific than the Yellow-edge-free strain which has recently been distributed. It is to be noted that the varieties of the *chiloensis* type, when infected, function as carriers of Yellow-edge; such varieties show the symptoms of disease little, if at all, but they serve as sources of infection, and so should not be grown in the vicinity of the very susceptible varieties which rapidly deteriorate. Meanwhile the

entomologists became associated with the investigation on these diseases, and Massee (1935) found that the Strawberry Aphis, *Capitophorus fragariae* Theob., is a vector of Yellow-edge, and more recently of Crinkle, in this country.

Mosaic is widespread among species of *Rubus*. Harris (1940a) has shown that in raspberries there are two types of mosaic, one (Mosaic 1) which is relatively mild and another (Mosaic 2) which may develop very severe symptoms in some varieties. A serious form of mosaic in the Lloyd George variety has been found by inoculation experiments to be brought about by a combination of Mosaic 1 and Mosaic 2. The vector of raspberry mosaic in this country has not yet been determined, and in the transmission experiments and in the analysis of the symptoms various grafting methods only have been employed. Lately, most success has been obtained by a method of cane-inarching, and this method has been used in the transmission and analysis of symptoms of a mosaic disease of the Bedford Giant blackberry, and of a Dwarf Disease, which at times is very destructive in plantations of the Phenomenal Berry, and has also been seen, though rarely, in the raspberry.

It has been found that the so-called Reversion in black currants can be transmitted by grafting (Amos *et al.* 1927); it is therefore considered to be a virus disease, and there is some evidence that the Big Bud mite serves as a vector. Particular attention has been paid to the recognition of this disease in the field in order that roguing diseased bushes may be carried out with accuracy and despatch, not only in the plantation but especially in the nursery, so that the grower can now be supplied with young bushes free from disease (Lees, 1922, 1925; Amos & Hatton, 1927).

In all these diseases the first step has been the recognition of their virus nature, and this was obtained by means of the grafting experiments which supplied evidence that the infective principle was transmitted in the sap. When their virus nature was established, the next step was the selection and propagation of virus-free clones. Such methods have been employed successfully, and now a grower can rely on obtaining vigorous stocks of certain varieties of raspberry, strawberry and black currant reasonably, if not wholly, free from these virus diseases when planted up. When the vector has been discovered attention has been directed to controlling it, and the Strawberry Aphis and Black Currant Mite have received the special consideration of entomologists in this respect.

Sometimes in our investigations the unexpected happens. The cause of a particular disease may appear to be obvious at first sight, and yet that conclusion may prove to be entirely erroneous when further observations are made. I have already referred to Die Back in stone-fruit trees, and how at first it was attributed to fungi found on the

stems while the actual parasite was within the tissues. More recently a spotting of apple leaves, assumed to be caused by a *Phyllosticta*, has been found to be brought about by an entirely different agent. Wenzl, who discovered this Angular Leaf Spot in Austrian nurseries, confidently assumed (and stated) that the fungus which he found on the spots and named *P. angulata* was the primary cause of the spotting. W. C. Moore (1939) published a clear illustrated account of Angular Leaf Spot as found on apple trees in England, and announced that he too had found a *Phyllosticta* conforming to Wenzl's description, but he made reservations as to the actual cause of the spotting. I, too, had occasion to examine apple leaves showing this disease in 1938 and 1939, and found a *Phyllosticta*; this, however, did not conform to Wenzl's description, and it had a different habit in culture; also on some of the spots there was a *Cladosporium* and not *Phyllosticta*, and as there were thus at least three fungi associated with the spotting doubts began to arise whether Wenzl's *Phyllosticta* was really parasitic, although those of us who examined the damaged leaves were prepared to accept his conclusion pending further investigation. What is probably the real cause of the spotting was revealed last June when Dr Massee and Mr Steer of the East Malling Research Station found an Angular Leaf Spot associated with an infestation by froghoppers. Moreover, they found that when the froghoppers were placed on leaves of apple trees, in the greenhouse or in the plantation, angular spots soon appeared. Meanwhile, some of these froghoppers were sent to Mr Moore at Harpenden who carried out a similar experiment, and apple leaves with spots induced by the froghoppers were examined from time to time during the summer, at East Malling and at Harpenden. In shape and size the spots resembled those illustrated by Wenzl and by Moore, but at first they were darker and more opaque; later, however, they assumed the appearance described for Angular Leaf Spot, and a *Phyllosticta* and *Cladosporium* appeared on the spots (Moore, W. C., 1940). We now assume therefore that Angular Leaf Spot of apple trees is caused, not by a *Phyllosticta*, but by this froghopper, *Cercopis sanguinea* Geoff. The disease thus comes within the purview of the entomologist, although the mycologist may find the fungal flora of the damaged leaves of some interest.

It is not always safe to assume from external symptoms alone that a particular disease is the same as one previously observed. As an instance of two different fungi producing similar symptoms may be mentioned a wilting of shoots of layers and stools of varieties of plums used as rootstocks. This disease was first noticed at East Malling in 1924. The fungus isolated from the underground lesions on such shoots at that time was the Brown Rot and Blossom Wilt fungus *Monilia cinerea*, and in inoculation experiments this fungus was found to produce the symptoms observed in the nursery (Wormald, 1935).

The disease was seen for two or three years but then it disappeared. Later, in 1932, what seemed to be the same disease broke out on another part of the Station. Some of the shoots, however, bore microsclerotia, and this suggested that the fungus present was not *Monilia*. In fact in many attempts at isolations since that time *Monilia* has not again appeared, but the fungus which almost invariably comes up on the plates is one that produces microsclerotia in culture. Although many such shoots were examined over several years no fungal fructifications were found on them, and since on various culture media tried the fungus produced numerous microsclerotia but no fructifications it could not be identified. Eventually, however, fructifications of a *Cylindrocladium* were found on wilting shoots of an apricot layer, and the conidia when germinated on culture plates gave rise to growth indistinguishable from that obtained from plum shoots, so that, pending confirmation from inoculation experiments, the disease now present in our layer and stool rows is assumed to be caused by a *Cylindrocladium*.

This by no means exhausts the list of those diseases of our fruit plants that have come under investigation during recent years. Some of them have been found to be caused by fungi not previously described, as the Fruit-Spotting fungus *Pleospora pomorum* (Horne and Horne, 1920), or by fungi not before recorded for Britain, e.g. *Corticium centrifugum*, the Fish Eye Rot fungus of apple (Colhoun and Muskett, 1935). Other diseases of which the parasitic organisms have been long well known, have been studied from the point of view of obtaining information leading to improved methods of controlling them. Thus Marsh and Maynard (1930) showed that an effective means of checking Currant Leaf Spot, caused by *Gloeosporium Ribis*, was to spray with Bordeaux mixture immediately the fruit is picked, while Saunderson and Cairns (1937) found that Gooseberry Cluster Cups (*Puccinia Pringsheimiana*) could be controlled by spraying with Bordeaux mixture or a 'colloidal copper' preparation if applied about a fortnight before the bushes came into flower.

I have confined my remarks to diseases of fruit trees and bushes, for, working at a fruit research station, I feel more competent to discuss such diseases than those of other crops. It must be borne in mind, however, that other crop plants have simultaneously received their due share of attention, and diseases of glasshouse plants, vegetables (particularly the potato with its many virus diseases), cereals, pasture and forage plants, hops, flax, the mushroom, and ornamental plants, have all come under investigation by plant pathologists at the various agricultural and horticultural research stations and in university laboratories.

In this review I have tried not only to indicate the knowledge we have obtained about these diseases and their control, but also to give

some idea of the methods adopted in acquiring that knowledge. An investigation of a plant disease is no longer merely identifying the parasitic organism and the employment of purely empirical methods for controlling disease. It is a study of the host/parasite complex in relation to the environment, particularly in the direction of rendering the host plant more resistant to attack, and ascertaining the best methods of control with the most effective time of applying direct or indirect measures against the parasite.

In conclusion, may I pay a warm personal tribute (though I know I express the feelings of my fellow plant pathologists) to those members of this Society whose interests lie more on the systematic side of mycology, and are always so ready to render aid in identifying organisms not readily recognized by the plant pathologists, or in naming and describing any newly discovered fungi that the plant pathologists meet with during the course of their investigations. Not all experimental research workers (possibly few) have that special flair for searching into the kinship and nomenclature of the organisms they encounter, and some of them at any rate are only too pleased to be able to relegate that side of the work to others. In this way the varied interests of the members of the Society interact for their mutual benefit. This is probably reflected most clearly in our Committee for Plant Pathology, of which some of the most active and indispensable members are primarily systematists. I trust that the systematists and field mycologists realize that their efforts are fully appreciated and that they are not only adding to our information on that very important group of plants, the fungi, but that they are aiding the plant pathologists to provide humanity with more and better produce of the soil.

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STUDIES ON *SCLEROTINIA* AND *BOTRYTIS*. I.

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(With Plates 1-3 and 1 Text-figure)

DE BARY (1866) appears to have been the first to connect the common grey mould, *Botrytis cinerea* Pers., with the Ascomycete *Sclerotinia*. Although Marshall Ward (1888, 358) credits Tulasne, Brefeld and others with discovering the connexion between *Botrytis cinerea* and the Discomycetes, I have been unable to trace such observations. The rise of pure culture technique threw doubt on the relation because cultures started with single conidia of *Botrytis* usually failed to yield apothecia.

This failure has been explained by the work of Drayton (1934), who showed that *Sclerotium Gladioli* Massey occurred in two compatibility groups which 'exhibit intra-group sterility, inter-group fertility, and individual self-sterility'. An apothecial stage (*Sclerotinia Gladioli* Drayton) was produced when spermatia were applied to compatible receptive hyphae in a suitable environment. The method was successfully extended to the genus *Botrytis* by obtaining *Sclerotinia* from *Botrytis convoluta* Whetzel & Drayton (Drayton, 1937) and from *B. cinerea* (Groves and Drayton, 1939). That the process of spermatization leads to true fertilization was demonstrated for *Sclerotinia Gladioli* because cultures from single ascospores when backcrossed with each of the parent isolates showed a segregation of the compatibility factor in a 1 : 1 ratio, thus providing experimental genetic evidence that spermatization leads to a fusion between spermatial and mycelial nuclei.

This pioneer work suggested the studies recorded here. In the belief that the behaviour of the fungi studied by Drayton under controlled laboratory conditions probably indicated similar behaviour out of doors, I tried to find confirmation in the field of the connexion between *Sclerotinia* and *Botrytis*, by exposing material naturally infected with *Botrytis* to conditions in the open air under which the requisite factors outlined by Drayton could operate. The mild humid climate of the south-west of England proved favourable to the search.

METHOD

It seemed probable that the chief obstacle to finding the hypothetical *Sclerotinia* forms in nature lay in the difficulty of finding and identifying the sclerotia on natural substrata after six or more months of weathering on the surface of the soil. Much time was spent looking for leaves bearing sclerotia on *Narcissus* beds, but none were found probably owing to weathering and the activity of worms. To overcome this difficulty sufficient withered leaves of *Narcissus* Soleil d'Or which had been killed by *Botrytis polyblastis* Dows. were raked together during the summer of 1937 to form a pile about four feet high. This was left on the ground at the Isles of Scilly Experiment Station, and examined from time to time. In February 1938 large numbers of apothecia were found developing from sclerotia in the *Narcissus* leaves. As reported previously (Gregory, 1938), these proved to be the unknown apothecial stage of *Botrytis polyblastis*, and the fungus was described and named *Sclerotinia polyblastis*.

Another more or less natural method of exposing sclerotia, and one much less extravagant of material and space, was used in subsequent experiments carried out at Seale-Hayne College, Newton Abbot. The drainage holes of some ten-inch flower-pots were plugged with glass-wool to exclude worms and insects. Material bearing sclerotia of *Botrytis* was placed in the bottom of the pot, or preferably on a layer of sand one inch deep, and the mouth of the pot covered with cheese-cloth. The larger the quantity of plant material the better seemed the chance of success.

The pots were kept on a layer of ashes in an alley between walls on the north and south sides, protected from the sun, but otherwise exposed to the weather, as illustrated in Pl. 1, fig. 1. Conditions inside the pots were damp enough during the winter to favour the growth of liverworts.

During 1938-40, fifty-six pots of material infected with *Botrytis* were exposed and the relationship of any apothecia found was investigated by means of single ascospore cultures. From *B. polyblastis*, apothecia were obtained freely in all fourteen pots used (Pl. 1, fig. 2); from *B. narcissicola* Kleb. in seven out of eight; from *B. cinerea* on dicotyledonous hosts in one out of eleven, and on monocotyledonous hosts in two out of nineteen; and from a new form of *Botrytis* on *Allium triquetrum* in the only pot exposed. If these species are self-sterile both compatibles presumably must have been present in the material when collected, and spermatization must have been brought about by some agent such as mites or movement in water films. Some may have been self-fertile, as apparently were *Sclerotinia Ricini* (Godfrey, 1923) and *S. Porri* (van Beyma thoe Kingma, 1927).

It must not be assumed too readily that apothecia observed in any pot belong to the form of *Botrytis* that was collected. Several Discomycetes were seen which could not be connected with any *Botrytis* stage. One pot full of leaves of *Narcissus* Golden Spur, bearing, when collected, sclerotia of *Botrytis narcissicola*, yielded three recognizably distinct types of apothecia during the winter of 1939-40, and these were studied by means of single ascospore cultures. Two apothecia found in December proved to be the perfect stage of *B. cinerea*. In January, a further specimen of this type developed, and also a crop of apothecia of *Sclerotinia narcissicola*. Towards the end of February there appeared also a fine crop of *S. polyblastis*.

The method has not proved of unlimited success, for sclerotia of *Botrytis* on *Tulipa*, *Galanthus*, *Hyacinthus*, *Scilla*, *Ixia* and *Gladiolus* have so far yielded only conidia (Pl. 2, fig. 2).

The presence of apothecia of a *Sclerotinia* on material infected with *Botrytis*, after a period of exposure, provides only circumstantial evidence of a connexion between the two forms. If conidia of *Botrytis* can be obtained, however, from cultures of single ascospores, then the connexion between the two forms is established as irrefutably as by the more difficult method of cross-mating cultures of conidial origin and so working back from the conidial to the ascospore stage.

Sclerotia, bearing single young apothecia, were placed on moist filter paper in sterile Petri dishes. The apothecia were allowed to shoot ascospores up to a film of plain agar on a cover-glass. Single ascospores were picked off the deposit so obtained and transferred to hanging drops of sterile agar by means of Hanna's (1928) modification of Dickinson's wet-needle technique, using a micromanipulator made from a few Meccano parts. Under optimum conditions, about twenty spores can be picked up in half an hour. This method of isolation permits any chosen spore to be examined at a high magnification before being picked from the spore deposit, again after it has been transferred in isolation to a hanging drop, and as often during germination as required to satisfy the worker that the spore isolated was in fact a single ascospore. A difficulty not yet entirely overcome is that a proportion of the spores fail to grow, apparently because of damage by pressure from the glass needle during isolation. After germination has been observed the agar drop containing the spore is transferred to a culture tube. The results of applying these methods to several species are described below.

I. *SCLEROTINIA POLYBLASTIS* GREGORY

Botrytis polyblastis Dowson (1928) was first known as a parasite of leaves of *Narcissus*. In the extreme south-west, occasional leaf spots occur on varieties of *N. tazetta* in March, but although the leaf may bend over at the lesion, few conidia are produced and the disease makes little progress. It is not until the foliage is beginning to mature and lose its blue-green colour (from the middle of April to May) that the typical epidemic of *Narcissus* Fire appears. Then, when weather is favourable, the disease begins at a few isolated spots, and sweeps over the field killing the foliage down to the ground in a few days. The apparent resistance of vigorous *Narcissus* foliage to infection by *Botrytis polyblastis* recalls the lettuce leaf which was found by Brooks (1908) to become susceptible to infection by *B. cinerea* only on yellowing. Sclerotia are formed plentifully on the withered leaves but they have not been found on the bulb, and the manner in which they initiate epidemics on the foliage was not known until it was observed that they give rise to apothecia (Pl. 1, figs. 2, 3).

A brief diagnosis of the cup-fungus has been given elsewhere (Gregory, 1938), but a more detailed description can now be given.

The sclerotia are black, smooth, up to 8 mm. long, immersed in the leaf and elongated in a direction parallel to the vascular bundles. They are usually pointed at the ends and somewhat resemble a grain of wheat. They have not been observed to germinate by conidia, but each normally produces from one to four apothecia (Pl. 1, figs. 2, 3) whose disks vary considerably in size, but may reach from 6.0 to 7.0 mm. in diameter when mature. The cup is fleshy and funnel-shaped where it joins the stipe. The stipe is 2-3 mm. long when the sclerotium is superficial but may be elongated and twisted when the sclerotium from which it grows is buried. The base of the stipe is blackened and in this region may bear a few long white hairs; the rest of the stipe and underside of the cup are not hairy, but are covered with minute white scales, which are, however, sparser than in *Sclerotinia narcissicola* described below. The disk is pale raw umber, and the stipe is also raw umber darkening to blackish below. The asci measure $135-180 \times 9-12 \mu$ with spores occupying $80-90 \mu$. The ascospores are oval to boat-shaped and measure:

Length: $12-21 \mu$ (mean of 75 = 17.3μ ; standard deviation 1.84; standard error 0.212).

Breadth: $6-12 \mu$ (mean of 75 = 8.7μ ; standard deviation 1.004; standard error 0.116).

A frequent but not invariable feature is that a proportion of spores in the ascus may be abortive, and can be recognized as such in the ascus before discharge. Although fully delimited and ejected with the normal spores they appear shrivelled and ghost-like, and fail to germinate. Similar spores are seen in *Sclerotinia narcissicola*.

Evidence of connexion with Botrytis polyblastis

To investigate the connexion between conidial and ascospore forms the following single-spore isolates were prepared and studied in culture:

1938 *Narcissus* Golden Spur, leaves, Scilly Isles: 9 single ascospores.

1939 *Narcissus* Golden Spur, leaves, Scilly Isles: 25 single ascospores.

1940 *Narcissus* Golden Spur, leaves, Scilly Isles: 17 single ascospores.

1938 *Narcissus* Grand Primo, flowers, Scilly Isles: 6 single conidia.

1940 *Narcissus* Golden Spur, flowers, Truro: 11 single conidia.

The media employed were: oatmeal extract agar, prune extract agar, malt extract agar, potato dextrose agar and sterilized stalks of *Narcissus*. When first isolated, the cultures both from ascospores and conidia were remarkably uniform in appearance, producing a small amount of white aerial mycelium, large round or rounded-elongate, flattened, black sclerotia on the surface of the medium often reaching 10–12 mm. in length, and in tube cultures coalescing where the slant meets the glass of the tube. Cultures from single ascospores on potato dextrose agar slants (Pl. 1, fig. 4) are typical of the isolates.

On oatmeal extract agar a culture three or four weeks old usually forms copious cream-coloured slimy masses of microconidia typical of the genus *Sclerotinia*; these are also formed regularly in smaller numbers on other media.

After some months in culture the isolates tend to degenerate towards a mycelial form, first losing sclerotia and eventually microconidia. With this change is associated a raw umber pigment in the medium, which is brightest on the reverse side of the culture. Pl. 1, fig. 5 shows a culture from an ascospore growing on potato dextrose agar. For comparison Pl. 1, fig. 6 shows a recently isolated conidial strain from a single conidium taken from a withered flower.

As *Botrytis polyblastis* has not so far produced conidia in culture it was necessary to resort to plant inoculations carried out with flowers of *Narcissus* grown at Newton Abbot, where the fungus is not known to occur naturally.

In one series of inoculations begun on 9 March 1938, opening flower-buds of the variety Grand Primo, from the glasshouse, were placed in deep dishes lined with moist paper. Each dish contained two buds, one of which remained uninoculated, while the other was inoculated by placing a fragment from a young culture on prune agar on the unwounded surface of the perianth. In this experiment, two isolates started each from single ascospores and five started each from several ascospores, were tested on different flowers. Two of the inoculations with multi-ascospore isolates failed, but in five days the other inoculations caused a rapidly extending brown-rotting of the tissues, and in seven days all the infected buds were bearing the large,

highly characteristic conidia of *Botrytis polyblastis*, some of which, when tested, germinated with from five to seven germ tubes. Six conidia were taken separately from the buds inoculated from cultures started from single ascospores, and these gave typical cultures of *B. polyblastis*. The flowers used as controls remained free from attack.

On 21 March, six opening flower-buds of *Narcissus* Empress and four of Scilly White were similarly inoculated by placing portions of agar cultures on the unwounded perianth. Eight different single-ascospore cultures, and two of the single conidial cultures reisolated from the previous experiment, were tested on separate flowers. One of these failed to attack the flower, but the other nine caused a rapid decay of tissue with the production of conidia of *Botrytis polyblastis* within ten days. One of the Empress flowers also developed a growth of *B. narcissicola* as a contaminant.

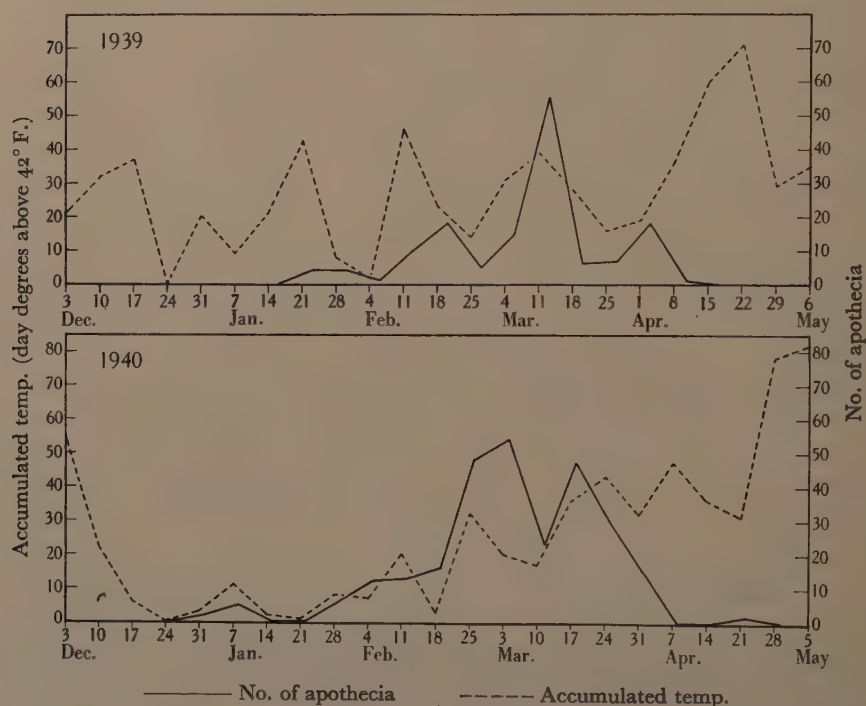
On 13 April, twenty-four leaf tips of Emperor, taken from the open field, were placed on sterile watch-glasses in moist dishes. Twelve of these leaves were inoculated by placing portions of agar culture on the unwounded surface, testing six single ascospore isolates in duplicate. Leaf infection occurred more slowly than when flowers were inoculated, and three of the twelve control leaves developed patches of *Penicillium* during the four weeks in which the series was kept under observation, but no *Botrytis* forms appeared on the controls. On two of the leaves the inoculum dried up, but on ten leaves lesions of varying size were produced below the inoculum. Two lesions produced aerial mycelium and microconidia only, while the remaining six gave conidia of *B. polyblastis*.

The similarity of cultures derived from ascospores and conidia, the production of characteristic conidia of *B. polyblastis* on leaves and flowers inoculated with single ascospore cultures, and the reisolation of the organism from such conidia is regarded as proof of the genetic connexion between the conidial and apothecial fructifications.

The disease in the field. Although described at first as a leaf disease it became apparent that Fire could also cause spotting of *Narcissus* flowers (Moore, 1939). In the south-west of England the occurrence of flower spot presented a mystery because widespread damage was sustained in wet weather some months before any sporulating lesions could be found on leaves to serve as a source of infection. For example, severe spotting of flowers of *Narcissus* Soleil d'Or due to *Botrytis polyblastis* was found by Mr Gordon W. Gibson at St Mary's during the last week of January 1937, yet in spite of careful search neither he nor I found leaf lesions in the district until 2 April, and the disease did not become epidemic on the foliage until the last week in April. It seemed that flower spot infection must either have come direct from the sclerotia on the ground, or from the fungus growing on some other host. This search for *B. polyblastis* on other hosts proved

fruitless but it yielded the fungus on *Allium triquetrum*, described below. The production of apothecia from sclerotia of *Botrytis polyblastis* already described provided a clue to the course of the disease in the field.

Sclerotinia polyblastis has not yet been found to occur naturally on *Narcissus* at Newton Abbot, but in the pots of leaves kept at this centre, apothecia were produced from January to April. During the



Text-fig. 1. *Sclerotinia polyblastis*. Number of apothecia produced weekly by samples of infected leaves 1939 and 1940, showing that when sclerotia are mature cropping is correlated with accumulated temperature (day-degrees above 42° F.).

seasons 1938-9 and 1939-40 records were kept of the number of apothecia that expanded each week at Newton Abbot from sclerotia on a sample of leaves collected during the previous summers at St Mary's. As shown graphically in Text-fig. 1 the production of apothecia started in January, reached a peak early in March, and ended in April, corresponding approximately to the period of flowering in the open of varieties *N. tazetta* and *N. pseudonarcissus* at Newton Abbot. The sclerotia of this fungus remain in a dormant condition until mid-winter, and the internal or external factors that determine their release from this state are obscure. However, when

the sclerotia have matured, in the presence of adequate water in the substratum, the development of apothecia is under the control of temperature. This is shown clearly in Text-fig. 1 where the weekly crop of apothecia is compared with the accumulated temperature (day-degrees above 42° F.) for the corresponding period. Eventually the number of apothecia produced falls off as the sclerotia become exhausted, and no more are produced even at favourable temperatures. If the same sclerotia are exposed for a further season one or two apothecia may be produced in the second spring. These are usually of a pale watery colour, but isolates from single ascospores apparently give normal cultures.

Detailed records of the production of apothecia in the Isles of Scilly are not available, but it is probable that the early flower spots caused by this fungus are direct ascospore infections from apothecia on overwintered sclerotia rather than from conidia on leaf lesions. In the milder climate of the Isles of Scilly the production of apothecia probably reaches its maximum and ceases several weeks before *Narcissus* Fire develops as an epidemic on the foliage.

Direct infection of the *Narcissus* perianth with ascospores has been achieved experimentally. Infections with pieces of agar cultures were readily obtained on flowers as described above, but it was also found easy to infect detached flowers directly with ascospores. Five flowers of Grand Primo were placed on moist absorbent paper in glass dishes, and single apothecia were placed so that their spores were discharged for periods of from two to six hours on the inner or outer sides of the perianth. All these flowers rapidly became infected and developed conidia of *Botrytis polyblastis* within eight days. The experiment was repeated with similar results with six flowers of Soleil d'Or. Inoculation of the uninjured perianth of detached flowers in moist dishes with portions of agar culture resulted in a rapidly progressing brown rot in four or five days, and in seven days, if the dish were not too moist, conidia of *B. polyblastis* appeared. It was evident that the perianth was much more easily infected with ascospores than were the leaves, though portions of leaves also became infected by ascospores ejected from apothecia if kept in moist dishes for about ten days.

Puffing of apothecia was observed on several occasions, and some records of spore discharge have been obtained from apothecia in the open air. An individual apothecium which is shedding spores can be dried and rewetted several times before the period of discharge is completed. The period of discharge appears to vary according to the size of the apothecium. Records of spore discharge were obtained from two apothecia supplied with plenty of water out of doors, the spores being collected on a slide and recorded daily. The larger specimen began to discharge on 6 March, reached a maximum about 20 March, and ceased on 23 March. For a smaller specimen the

corresponding dates were 6, 11 and 13 March. Thus in these two specimens, discharge lasted from seven to sixteen days.

In the field a picker seeing a spotted flower or flower-bud often leaves it on the plant. Soon the whole perianth, ovary, and even part of the stalk wither and become covered with a short dense greyish white layer of conidia, far more luxuriant than is ever found on the leaves where conidial production at its best is somewhat sparse. This phase, which has hitherto been overlooked, is illustrated in Pl. 2, fig. 1, which is a photograph of a withered flower covered with spores collected from a field of Golden Spur at Truro. The identity of the organism present in this collection was confirmed by eleven single conidial cultures. Surveys of *Narcissus* fields shortly after flowering have shown that in the Isles of Scilly, Cornwall and south Devon such profuse spore production on withered flower heads is exceedingly common. It may well be claimed that *Sclerotinia polyblastis* is a virulent parasite of the perianth of *Narcissus* and only attacks the foliage when the leaves are nearing maturity.

Flowers may be left unpicked for a number of reasons besides blemish at the time of picking. They may belong to rogue varieties (e.g. in Golden Spur); they may not be worth picking owing to a glut (e.g. Princeps); and often a few small flowers from offsets appear very late after the main crop has been removed, and these are not considered worth fetching in (e.g. Helios).

Such withered flowers remain for weeks on their stalks producing conidia of *Botrytis polyblastis* in great numbers, yet, as observation shows, the leaves around them must still be relatively resistant to infection. Eventually, with suitable weather as the foliage matures, the disease suddenly spreads over the field. In the first stages of the *Narcissus* Fire epidemic, the leaves are attacked in isolated groups of plants, and inspection at this time invariably reveals a diseased flower acting as a focus for each patch. In the Isles of Scilly growers have noticed that where fields of Princeps are left unpicked the foliage may die off very rapidly. It would be interesting to know whether a light crop from this variety, notably irregular in Scilly, normally follows a glut year when the flowers on many fields are left unpicked and the leaves succumb to an early attack of fire.

The life cycle of *Sclerotinia polyblastis* can now be pieced together. At the end of the winter the sclerotia produce apothecia at about the time when *Narcissus tazetta* and *N. pseudonarcissus* are in flower. The ascospores infect the perianth and may cause widespread flower spotting, but the leaf tissue is apparently resistant to infection at this time. The fungus survives on withered flowers and these produce enormous numbers of conidia which cause an epidemic on the maturing foliage. On the leaves, conidia are also produced somewhat sparsely, and these no doubt serve to disseminate the disease.

Eventually the leaves produce large numbers of sclerotia. For the practical control of the disease there are two obvious points in the life cycle at which the fungus can be attacked by sanitation methods, although so far their effect has not been studied experimentally. These are: (1) removal and destruction of all withered *Narcissus* foliage during summer in order to get rid of most of the sclerotia and thus to reduce flower spot during the following year; and (2) removal from the field of all flowers in order to break the cycle between sclerotium and leaf infection. If done thoroughly these measures should go far towards preventing Fire epidemics.

2. *SCLEROTINIA NARCISSICOLA* N.SP.

Botrytis narcissicola Kleb. causes a disease of *Narcissus* known as Smoulder or Grey Mould which may rot the leaves at ground level, simulate *Narcissus* Fire on the foliage, cause a spotting of the perianth or, sometimes, rot the bulbs. Sclerotia on leaves kept in pots at Newton Abbot germinated by means of conidia from early in December onwards (Pl. 2, fig. 2), and these may be the source of flower spotting in winter, but it is possible that some of the flower infection is by means of ascospores.

On 6 March 1939 apothecia (Pl. 2, fig. 3) as well as conidia were found developing from sclerotia on old leaves of *Narcissus* Golden Spur which had been affected with Smoulder when collected during the previous spring at St Mary's, Isles of Scilly. From January to March 1940 apothecia were again produced on more material from the same field at St Mary's, and also on leaves of *Narcissus* Double White collected with Smoulder in 1939 in the Tamar Valley. The peak of apothecial production at Newton Abbot appeared to be during March.

To ascertain whether these apothecia were connected with *Botrytis narcissicola*, a number of single ascospore and single conidial cultures were obtained in the manner described above from sclerotia on leaves of Golden Spur from St Mary's, and compared:

Overwintered sclerotia 1939: Single conidia, 5 cultures.

Single ascospores, 9 cultures.

Overwintered sclerotia 1940: Single conidia, 4 cultures.

Single ascospores, 6 cultures.

Sample cultures from the various groups of isolates were grown for comparison on oatmeal extract agar, malt extract agar, and potato dextrose agar and showed the superficial greyish, felty, aerial mycelium (Pl. 2, fig. 4), with small flat rounded sclerotia evenly distributed over the surface of the medium (Pl. 2, figs. 5, 6), recognized as characteristic of *B. narcissicola*, and it was concluded that the apothecia

found on the aestivated sclerotia were in fact the perfect form of this fungus.

In the summer of 1939 a few typical conidiophores and conidia of the *Botrytis* type were produced in several single ascospore cultures on oatmeal extract agar. *B. narcissicola* does not normally produce conidia freely in culture, therefore a series of single-ascospore and single-conidium isolates were transferred to portions of flower stalks of *Narcissus* which had been sterilized by autoclaving in plugged tubes in an attempt to obtain more conidia. When young, the cultures on this medium did not sporulate, but after five months the tubes were brought out of a cupboard, and when kept in the light for a few weeks the sclerotia developed profuse masses of conidia of the *Botrytis* type (Pl. 2, figs. 7, 8). This profuse production of conidia of *Botrytis* from single ascospore cultures on sterilized stalks of *Narcissus*, together with the characteristic mycelium and small sclerotia on other media, confirms the conclusion that the apothecia are the perfect stage of *Botrytis narcissicola* Kleb., and the name *Sclerotinia narcissicola* is accordingly proposed.

Sclerotinia narcissicola n.sp.

Synonym: *Botrytis narcissicola* Kleb.

Sclerotia black, smooth, more or less globose, 1–1.5 mm. in diameter. Apothecia arising singly from sclerotia in winter and spring, cup-shaped, becoming funnel-shaped, disk flat, reaching 2.5 mm. in diameter, warm sepia to raw umber when mature. Stipe raw umber 1.5–5 or more mm. long, tapering towards the blackish base. Under side of cup, and the stipe, covered with minute, somewhat revolute white to brownish scales.

Asci 120–140 × 8 μ , spores occupying 60–90 μ .

Ascospores 8, 1 or 2 seriate, hyaline, indistinctly biguttulate, naviculate, 10–20 × 5–9 μ (mean 15.4 × 7.1 μ).

Samples of ascospores taken from the apothecia gave the following measurements:

Number of spores measured	Length μ	Standard deviation	Range μ	Breadth μ	Range μ
27	15.3	1.170	13–18	7.1	5–9
25	14.1	0.782	12–16	6.7	6–8
25	15.5	1.893	12–20	7.2	6–8
50	13.1	1.464	10–17	5.97	5–7
50	14.5	1.418	13–18	6.56	5–9

Conidial stage: *Botrytis narcissicola* Kleb.

Habitat: at Newton Abbot on sclerotia on aestivated leaves of *Narcissus pseudonarcissus* from St Mary's, Isles of Scilly (Type), and *N. poeticus* from Bere Alston, Devon.

Sclerotinia narcissicola sp.n.

Apothecia Warm Sepia, in maturitate Raw Umber (Ridgway), squamis albidis vel pallide brunneis cincta, plerumque singula e sclerotio nigro, nonnihil globoso, laevigato 1.0-1.5 mm. diam. oriunda, primo cyathiformia, dein infundibuliformia sed disco plano praedita, ad 2.5 mm. diam.; stipites similiter colorati cinctique, ad basim nigrescentem versus teretes. Asci cylindracei, 120-140 $\times$ 8 μ (p. sp. 60-90 μ). Ascosporae 8, mono- vel distichae, naviculares, hyalinae, indistincte biguttatae, 10-20 $\times$ 5-9 μ (in medio 15.4 $\times$ 7.1 μ).

Status conidialis *Botrytidi narcissicola* referendus.

3. *SCLEROTINIA SPHAEROSPERMA* N.SP.

In April 1937 a curious *Botrytis* was found on *Allium triquetrum*, a troublesome weed in the Isles of Scilly. On plants in a hedge at the Experiment Station, St Mary's, were found numerous white leaf-spots bearing a sparse layer of conidia (Pl. 3, fig. 1) which bore some resemblance to those of *Sclerotinia polyblastis*. The disease has since been seen each year in the same spot but has not been found elsewhere. The highly characteristic conidia which are borne in a single whorl on stout unbranched conidiophores are spherical, averaging about 23 μ (Pl. 3, figs. 3, 4) and germinating by three or four germ tubes. *Botrytis globosa* (Raabe, 1938) on *Allium ursinum*, appears somewhat similar but has much smaller conidia.

In May 1939, a quantity of infected leaves bearing sclerotia was collected and placed on a layer of sand in a pot at Newton Abbot. When examined on 6 December 1939, numerous apothecia (Pl. 3, fig. 2) were found growing from the sclerotia. More apothecia were found on 11 January 1940, but none developed later. The occurrence of conidia on the sclerotia has not been observed in this species.

Apothecia were brought into the laboratory and twenty single ascospores were isolated in hanging drops by the usual method. Evidently the spores of this species are very fragile, for eighteen of them failed to grow and the drops of agar remained sterile. Two, however, gave mycelia which closely resemble cultures from single conidia, as illustrated in Pl. 3, figs. 5, 6. Young cultures from single ascospores on malt extract agar produce the large spherical conidia in small heads freely over the surface of both mycelium and sclerotia, thus establishing the genetic connexion between conidia and apothecia. The fungus appears to differ from related species described previously, and it is accordingly named *Sclerotinia sphaerosperma* with reference to its spherical conidia.

Sclerotinia sphaerosperma n.sp.

Sclerotia, black, ovate-sphaeroidal, 1.5-2.5 $\times$ 0.5-1 mm. Apothecia one or two arising from each sclerotium, cup-shaped, becoming discoid, flat, 1-1.5 mm. in diameter, by 0.3 mm. thick, warm sepia.

Underside of cup and stipe smooth. Stipe isodiametric, dark at base, 1.5–3.3 mm. long.

Asci $240 \times 14\text{--}15\mu$, spores occupying half the length.

Ascospores 8, hyaline, uniseriate, with one or more guttules, naviculate, $17\text{--}26 \times 8\text{--}12\mu$ (mean of 50: length 21.24μ ; standard deviation 4.884; standard error 0.691; breadth 9.98μ ; standard deviation 4.12; standard error 0.583). Some abortive spores present.

Conidial stage of *Botrytis* type. Conidiophores hyaline, short, $160\text{--}700\mu$ long by $7\text{--}20\mu$ broad, rarely branched. Conidia in compact heads, usually a single whorl, hyaline, spherical, germinating with 1–4 germ tubes. Conidial measurements:

(1) From living leaves: $20\text{--}28\mu$ diameter (mean of 50 spores: 23.2μ ; standard deviation 1.952; standard error 0.276).

(2) In culture from a single ascospore: $18\text{--}28\mu$ (mean of 50 spores: 22.9μ ; standard deviation 7.235; standard error 1.023).

Habitat: Conidial stage on leaf spots on *Allium triquetrum* in spring at St Mary's, Isles of Scilly. Apothecia in winter from sclerotia on aestivated leaves of *Allium triquetrum* from St Mary's, Isles of Scilly, at Newton Abbot, Devon.

✓ *Sclerotinia sphaerosperma* sp.n.

Apothecia Warm Sepia (Ridgway), e quoque sclerotio nigro, ovatogloboso, $1.5\text{--}2.5 \times 0.5\text{--}1.0$ mm., singula vel dua oriunda, primo cyathiformia, dein discoidea, laevigata, $1.0\text{--}1.5$ mm. diam., 0.3 mm. crassa; stipites cylindracei, basim versus nigrescentes, laevigati $1.5\text{--}3.0$ mm. alti. Asci cylindracei, ascosporas in parte superno gerentes, $240 \times 14\text{--}15\mu$. Ascosporae 8, monostichae, naviculares, hyalinae, guttulis singulis vel pluribus praeditae, $17\text{--}26 \times 8\text{--}12\mu$ (in medio $21.7 \times 10.0\mu$); aliquando abortivae.

Status conidialis *Botrytidi* referendus.

Conidiophora robusta et brevia, hyalina, $160\text{--}700 \times 16\mu$. Conidia in capitulis compactis, plerumque in verticillo singulo dispositis, producta, globosa (ergo *sphaerosperma*), hyalina, $20\text{--}28\mu$ diam. (in medio 23.2μ), per tubos germinationis singulos ad quatuor pullulantia.

This work was mainly carried out at Seale-Hayne Agricultural College, Newton Abbot, with financial assistance from the Great Western Railway Company through the Cornwall Farmer's Union, and the Ministry of Agriculture and Fisheries upon the recommendation of the Agricultural Research Council to whom grateful acknowledgements are made. Thanks are also due to Mr W. C. Moore for help with literature and to Mr E. W. Mason who wrote the Latin diagnoses.

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EXPLANATION OF PLATES 1-3

PLATE 1. *Sclerotinia polyblastis*

- Fig. 1. Method of exposing plant material bearing sclerotia of *Botrytis* for production of apothecia during winter and spring under natural conditions at Newton Abbot.
- Fig. 2. Group of apothecia from sclerotia on leaves of *Narcissus Soleil d'Or*, 4 March 1938 ($\times 2.7$).
- Fig. 3. Apothecia produced singly from sclerotia, 4 March 1940 ($\times 5.2$).
- Fig. 4. Six single-ascospore cultures isolated 8 February 1940 after three weeks' growth on potato dextrose agar.
- Fig. 5. Single-ascospore culture on potato dextrose agar from apothecium from leaves of *Narcissus Grand Primo*, collected Scilly Isles 1938, isolated April 1939.
- Fig. 6. Single conidial culture on potato dextrose agar of *Botrytis polyblastis* from withered perianth of *Narcissus Golden Spur*, collected Truro, 17 April 1939 (see Pl. 2, fig. 1).

PLATE 2. *Sclerotinia polyblastis* and *Sclerotinia narcissicola* n.sp.

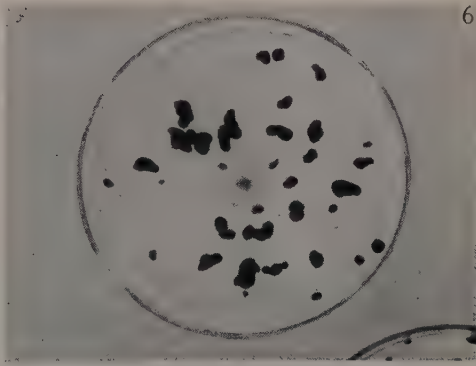
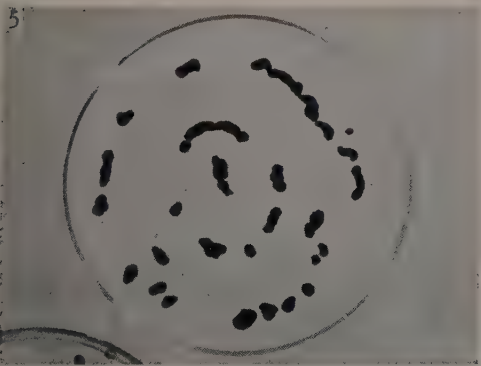
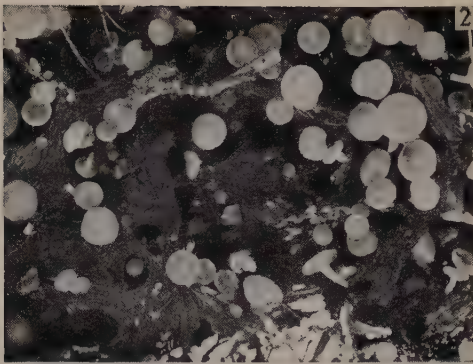
- Fig. 1. *Sclerotinia polyblastis*. Withered flower of *Narcissus Golden Spur*, collected Truro, 17 April 1940, approximately one month after flower crop had been harvested ($\times 2.6$).
- Figs. 2-8. *Sclerotinia narcissicola* sp.n.
- Fig. 2. Production of conidia of *Botrytis narcissicola* by sclerotia on leaves of *Narcissus Golden Spur* (collected Scilly Isles, 1938) in flower pot, 20 January 1939 ($\times 3$).
- Fig. 3. Production of apothecia (and conidia) by sclerotia in same flower pot as Pl. 2, fig. 2, 6 March 1939 ($\times 5$).
- Fig. 4. Nine single-ascospore cultures from sclerotia on leaves of *Narcissus Golden Spur* (collected Scilly Isles 1938) isolated 8 March 1939, sixteen days' growth on malt extract agar.
- Fig. 5. *Botrytis narcissicola*. Single conidium culture on potato dextrose agar, isolated 6 March 1939, from sclerotia on old leaves.
- Fig. 6. *Sclerotinia narcissicola*. Single-ascospore culture on potato dextrose agar, isolated 28 March 1939 from same batch of sclerotia as Pl. 2, fig. 5.

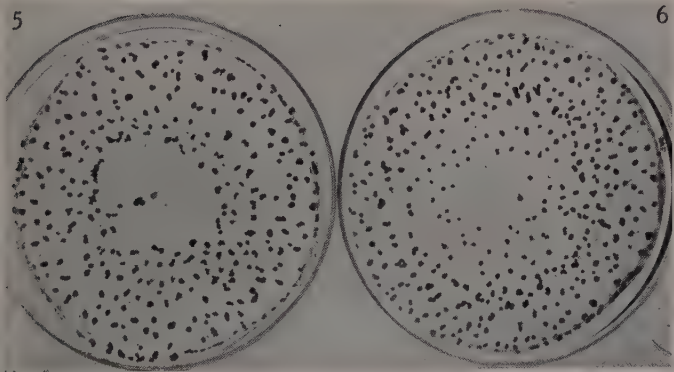
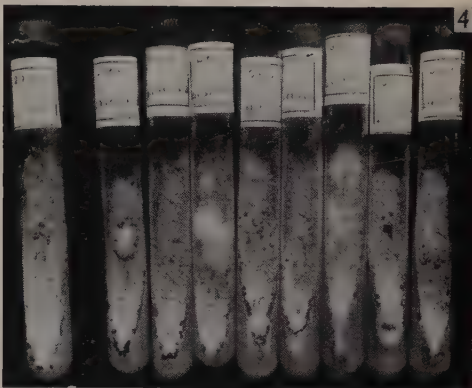
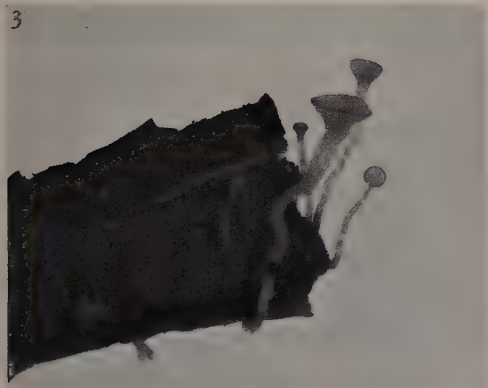
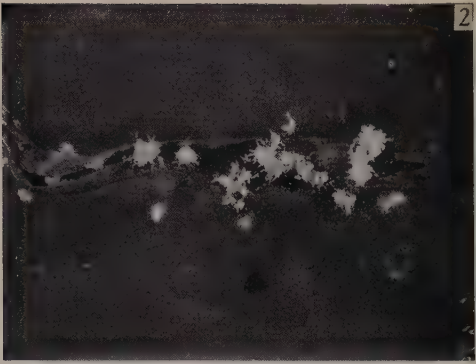
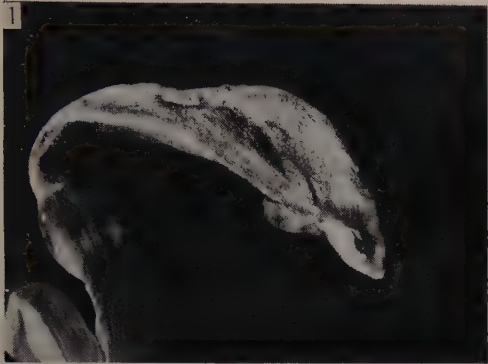
- Fig. 7. *Botrytis narcissicola*. Single-conidium isolate from grey mould on leaves of *Narcissus* Double White, Tamar Valley, 23 May 1939, culture on autoclaved *Narcissus* stem ($\times 2.8$).
- Fig. 8. *Sclerotinia narcissicola*. Single-ascospore isolate, culture on autoclaved *Narcissus* stem showing production of *Botrytis* conidiophores, similar to those in Pl. 2, fig. 7 ($\times 2.8$).

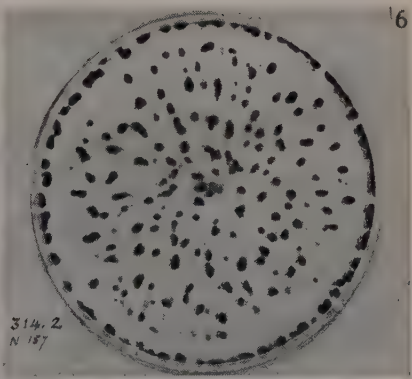
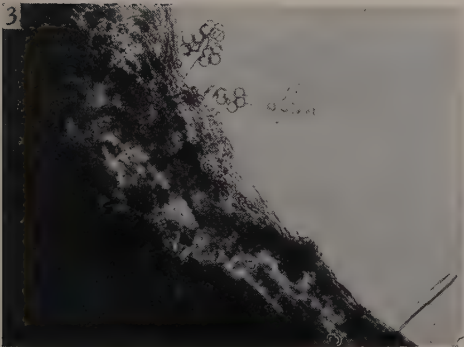
PLATE 3. *Sclerotinia sphaerosperma* sp.n.

- Fig. 1. Conidiophores on young leaf tip of *Allium triquetrum*, January 1940 ($\times 6.7$).
- Fig. 2. Production of apothecia, January 1940, from sclerotia on aestivated leaves of *Allium triquetrum*, collected Scilly Isles May 1939 ($\times 4.4$).
- Figs. 3, 4. Spherical conidia on conidiophores of *Botrytis* type produced on leaf spots of *Allium triquetrum* ($\times 115$ in lacto-phenol).
- Fig. 5. Single-ascospore culture at six weeks on potato dextrose agar, isolated 7 December 1939, from apothecium on aestivated leaves.
- Fig. 6. Single-conidium culture at six weeks on potato dextrose agar, isolated 23 May 1939 from leaf spot.

(Accepted for publication 9 November 1940)







STUDIES ON BRITISH CHYTRIDS

I. *PHLYCTOCHYTRIUM PROLIFERUM* SP.NOV. AND
RHIZOPHIDIUM LECTHII SP.NOV.

By C. T. INGOLD

Department of Botany, University College, Leicester

(With Plate 4 and 3 Text-figures)

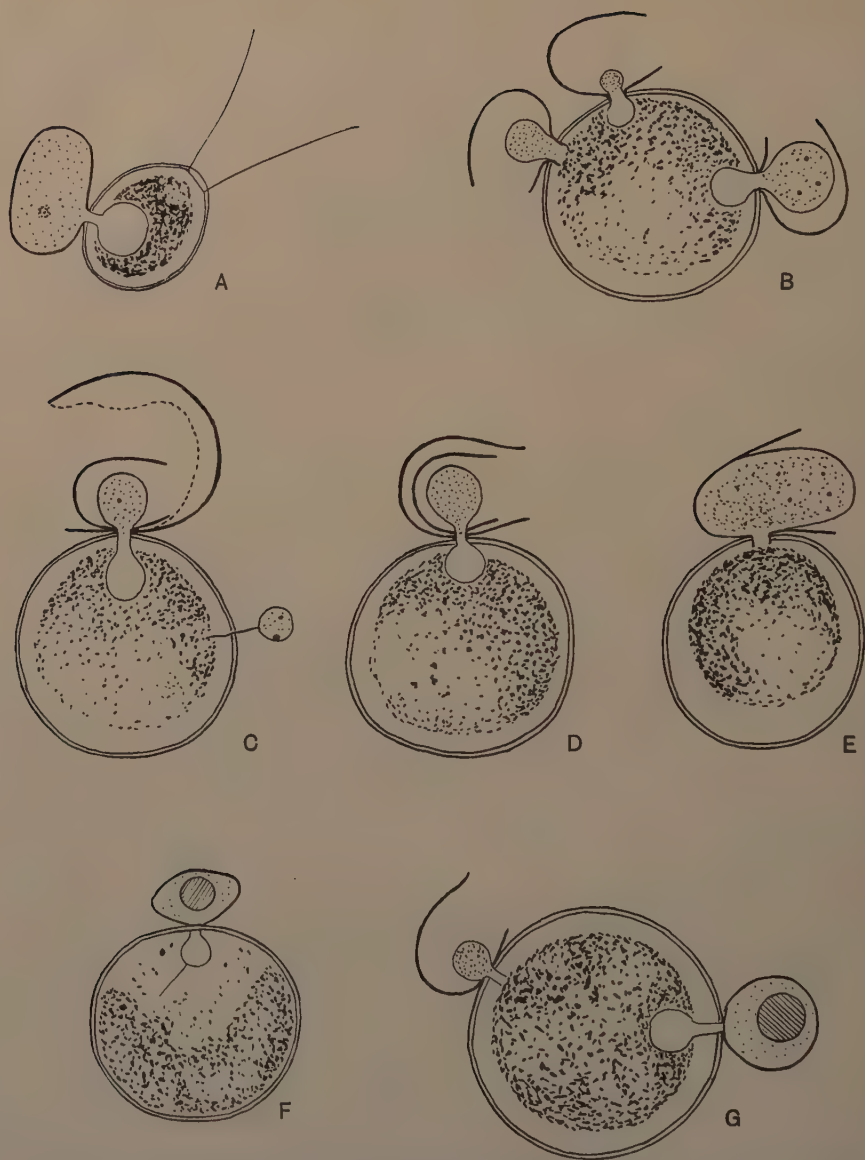
PHLYCTOCHYTRIUM PROLIFERUM SP.NOV.

THIS chytrid (Text-fig. 1) was found growing as a parasite on a species of *Chlamydomonas* in a temporary pond on Mortimer Common near Reading. In the sample of water from this pond which was examined *Chlamydomonas* was fairly scarce, but many of the individuals were parasitized. The fungus did not seem to produce any noticeable injury to its host, and active, swimming cells of *Chlamydomonas* were frequently seen with several of the parasites attached.

The fully grown chytrid consisted of a small spherical swelling within the host cell and an external sporangium. The wall of the swelling was very thin, and in some specimens a few extremely fine rhizoids were observed radiating from it. Occasionally, apparently because of the dense green of the host contents, it was impossible to see the intramatrical swelling (Text-fig. 1 B, E, G). The sporangium was egg-shaped with its longest axis parallel to the surface of the host.

Apparently dehiscence occurred by the solution of part of the sporangium wall, leaving a wide gaping mouth. This is shown in Text-fig. 1 C, where, besides the optical section, a higher focus (indicated by the dotted line) gives the outline of the edge of the mouth of the dehiscent sporangium. The escape of spores was observed only once. The zoospores were motile, spherical, 3μ in diameter, but unfortunately the ciliation was not observed.

The most striking feature of the fungus was the regular and constant occurrence of internal proliferation of the sporangium. An empty sporangium was never seen without a new one developing inside it (Text-fig. 1 and Pl. 4, fig. 1), although scores of sporangia from which spores had escaped were examined. In a number of examples (Text-fig. 1 C, D) the young developing sporangium was surrounded by two empty sporangia. Concentric sporangia of this type sometimes had their dehiscence pores all in the same direction (Text-fig. 1 D), but sometimes the dehiscence of the second sporangium was in the opposite direction to the first (Text-fig. 1 C). In one specimen the

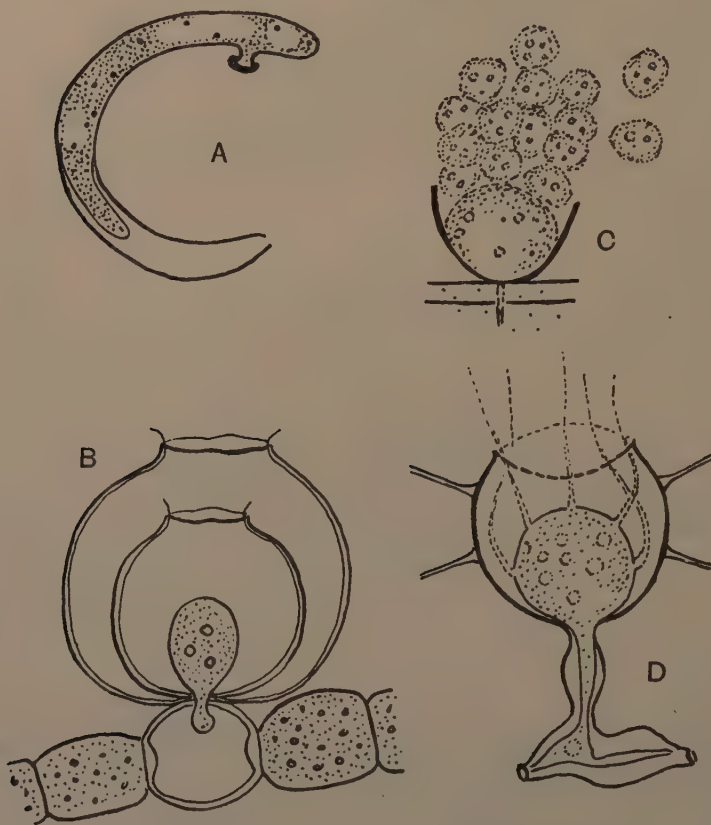


Text-fig. 1. *Phlyctochytrium proliferum* sp. nov. on *Chlamydomonas* sp. A, motile *Chlamydomonas* with the parasite. B, host cell with three parasites. Each sporangium shows internal proliferation. In one the intramatrix swelling cannot be seen. C, on the right is a very young individual. The other one is showing proliferation of the sporangium. The two empty sporangia face in opposite directions. In the outer one the edge of the mouth of the sporangium is shown by a dotted line representing a higher focus. D, chytrid with two empty sporangia which have dehiscence in the same direction. E, internal proliferation with the second sporangium exceeding the first. F, resting spore. G, resting spore and sporangium attached to the same host cell. Drawn with camera lucida $\times 1500$.

second sporangium had its longitudinal axis at right angles to that of the first. Usually the sporangium of the second generation was much smaller than its predecessor, although rarely the second sporangium was as big as, or bigger, than the first (Text-fig. 1 E).

The question of internal proliferation in the monocentric chytrids of the Rhizidiaceae is interesting. Such proliferation has been observed repeatedly in *Harpochytrium Hedinii*, an organism which has been included by most workers in the Chytridiales, but now, according to Scherffel (1926) should be removed from the Fungi and regarded as an epiphytic, saprophytic alga belonging to the Xanthophyceae. In *Harpochytrium* a basal part of the sporangium does not take part in zoospore cleavage, and, after the escape of the spores, this grows to form a new sporangium. Sparrow (1936) described a chytrid, *Thraustochytrium proliferum*, in which this kind of internal proliferation occurred regularly. De Wildeman (1895) observed internal proliferation occurring frequently in his *Phlyctochytrium Spirograe*. Raitschenko (1902) found on *Anabaena* a chytrid which he referred to *Rhizophidium sphaerocarpum* (Zopf) Fischer. In this he described a type of internal proliferation which sometimes occurred. This seemed to be due to a zoospore remaining behind and germinating within the old sporangium to give a new individual. It is to be noted that quite empty sporangia also occurred in Raitschenko's material, although, in the German summary of his paper, he gives no indication of the frequency with which internal proliferation was observed. It is interesting that his figure should bear such a striking resemblance to my own (cf. Text-figs. 1, 2 C), but there seems no reason to doubt Raitschenko's explanation of the process in his organism. Karling (1937), for *Phlyctochytrium chaetiferum* Karling, and (1930) for *Diplophlyctis intestina* recorded zoospores remaining behind and germinating within the sporangium to produce a new individual concentric with its parent, and the question arises whether this may be the true explanation of the appearance which I have observed in *Phlyctochytrium proliferum*. It must be emphasized that I have not watched the development of successive sporangia in a single individual, and can only base my conclusions on the examination of a large number of individuals at different stages of development. The striking fact is that I have never seen an empty sporangium, since there has always been a new sporangium developing within a dehiscent one. My impression is that the second sporangium is developed, as in Sparrow's *Thraustochytrium*, from a portion of the protoplasm which does not take part in the original cleavage into spores during the development of the first sporangium. However, this portion of the protoplasm which remains behind, and which gives rise to the second sporangium, may well be the equivalent of a single zoospore.

My observations on *Phlyctochytrium proliferum* were made on one small sample of pond water which I kept in the laboratory for several days. Towards the end of this time resting spores made their



Text-fig. 2. Examples of internal proliferation. A, *Harpochytrium Hedinii* Wille. It is attached to the filament of *Spirogyra* (not figured) by the lateral holdfast disk. A new sporangium is developing within the old empty one. $\times 1050$ (original). B, *Rhizophidium sphaerocarpum* (Zopf) Fischer on *Anabaena*. $\times 600$ (after Raitschenko, 1902). C, *Thraustochytrium proliferum* Sparrow on *Bryopsis plumosa*. The non-motile spores are escaping from the open sporangium. The protoplasm remaining at the base gives rise to a new sporangium. $\times 1520$ (after Sparrow, 1936). D, *Phlyctochytrium chaetiferum* Karling. Internal proliferation due to a zoospore remaining behind and germinating within the old sporangium. The sporangium is extramatrical. The rest is within the cell of *Hydrodictyon* (not shown). The rhizoidal system is omitted. Highly magnified (after Karling).

appearance. The resting spore (Text-fig. 1 F, G) was extramatrical, and, although not noticeably thick-walled, had a highly refractive wall. The spore contained a single oil droplet which gave a pale

brownish colour to the whole spore. Germination of this spore was not observed.

The following is a description of the species suggested:

Phlyctochytrium proliferum sp. nov.

Sporangium ovoid, $10-15 \times 6-10 \mu$, with the longitudinal axis parallel to the surface of the host cell. Sporangium dehiscing by large lateral pore. Zoospores spherical, 3μ in diameter, uniguttulate. New sporangia formed by a process of internal proliferation. Intramatrix part spherical or sub-spherical, $3-5 \mu$ in diameter. Resting spores spherical or ovoid, 8μ in diameter, smooth-walled, extramatrix, with a single conspicuous oil drop. Parasitic on living *Chlamydomonas*.

✓ *Phlyctochytrium proliferum* sp. nov.

Sporangium ovoideum, $10-15 \mu$ long., $6-10 \mu$ diam., axe longitudinali parallelo ad superficiem cellulæ matricis. Sporangium dehiscens poro magno laterali. Zoosporae globosae, 3μ dia., uniguttulae. Nova sporangia ratione proliferationis internæ formata. Intramatrix pars globosa vel subglobosa, $3-5 \mu$ dia. Sporae perdurantes globosae vel ovoidae, 8μ dia., parietibus glabris, extramatrix, una insigni gutta olei. Hab. ad *Chlamydomonas* vividam.

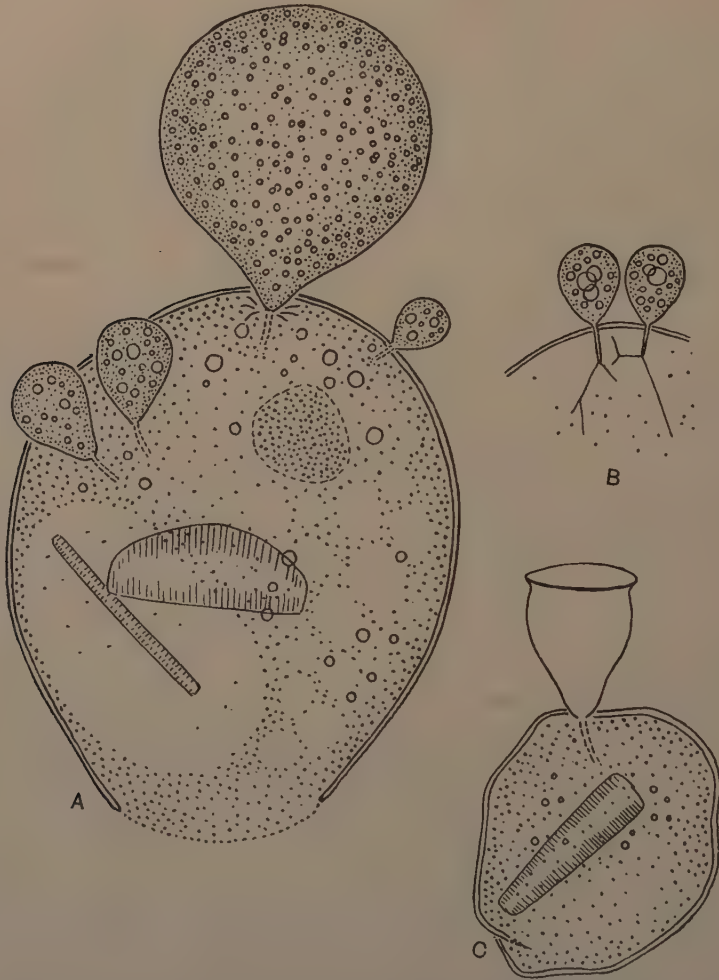
RHIZOPHIDIUM LECYTHII SP. NOV.

This chytrid was found parasitizing the rhizopod *Lecythium hyalinum* in a sample of water and algae collected at Cropston in Leicestershire from the stream which drains Cropston Reservoir. *L. hyalinum* is one of the rhizopods with a "shell" covering the protoplast except at one end where the fine pointed pseudopodia protrude. When mounted under a coverslip the pseudopodia are frequently withdrawn, and the protoplasm at the open end of the cell takes on a smooth outline (Text-fig. 3), or sometimes some of the protoplasm flows out to form a spherical globule (Pl. 4, fig. 2) still retaining, however, connexion with the protoplasm within the shell. This appears to be the characteristic behaviour of *L. hyalinum* under anaerobic conditions. Inside the rhizopod there usually occur several ingested algae, principally diatoms.

In the material which I examined, nearly all the specimens of the rhizopod were attacked by a chytrid, but in spite of this they remained not only alive but also active. An individual was often seen creeping about with ten or more chytrids on it.

In *Rhizophidium Lecythii* the mature sporangium was pear-shaped with the narrow end attached to the shell of the rhizopod. The size varied considerably from 20 to 40μ high by 16 to 32μ broad. From

the base of the sporangium a relatively thick and straight rhizoid penetrated the shell, and passed into the protoplasm of the rhizopod cell. From the end of this main rhizoid fine branched rhizoids rami-



Text-fig. 3. *Rhizophidium Lecythii* sp. nov. on *Lecythium hyalinum*. A, living rhizopod with four sporangia of the chytrid attached. The largest sporangium is almost mature. The main rhizoid only, indicated by dotted outline, can be seen within the host. B, two developing individuals of the fungus showing the intramatrix rhizoidal system. C, empty sporangium. All drawn with camera lucida from living material. $\times 1070$.

fied in the protoplasm. In living material it was usually impossible to see these fine rhizoids, but in material which has been pickled for some time in formalin these are clearly visible.

Dehiscence of the sporangium and the escape of spores was not observed. Many empty sporangia were, however, seen, and these were of a highly characteristic form being vase-shaped with a wide apical opening (Text-fig. 3C and Pl. 4, fig. 5).

This chytrid appears to be a new species. It resembles most closely *Rhizophidium echinatum* (Dang.) Fischer which was described by Dangeard (1888) as a parasite of the peridinian *Glenodinium cinctum*. *Rhizophidium Lecythii* agrees with *R. echinatum* in the pyriform shape of the sporangium, but the sporangium of the latter is much smaller ($10-13\mu$ in length) and more triangular in longitudinal section. Again the general form of the empty sporangia is much the same in the two organisms. In *R. echinatum* a straight unbranched rhizoid occurred, while in the chytrid on *Lecythium* there was a branched system of fine rhizoids springing from the straight main rhizoid. This difference cannot, however, be stressed, since a fine rhizoidal system is easily overlooked. Finally *Rhizophidium echinatum* was chiefly distinguished by its spinous resting-spore, while in *R. Lecythii* resting spores have not been observed. *R. Lecythii* also shows a certain resemblance, both in the shape of the sporangium and in the form of the empty sporangium, to *R. clinopus* described by Scherffel (1931) who found the chytrid growing on various species of diatoms.

It seems desirable to regard the chytrid on *Lecythium* as a new species with the following description:

✓ *Rhizophidium Lecythii* sp.nov.

* Sporangium pear-shaped or top-shaped, $20-40 \times 16-32\mu$, dehiscing by a large apical pore. Empty sporangium vase-shaped. Intramatrix rhizoidal system consisting of a stout straight part with fine rhizoids branching from its tip. Resting spores not observed. Parasitic on living individuals of the rhizopod *Lecythium hyalinum*.

Rhizophidium Lecythii sp.nov.

Sporangium piriformium vel forma turbonis, $20-40\mu$ long., $16-32\mu$ dia., dehiscens poro magno apicalie. Sporangium inane forma vasis. Systema intramatrix rhizoideum crassa recta parte et rhizoidibus tenuibus tendentibus a fine rectae partis. Sporae perdurantes non observatae. Hab. ad *Lecythium hyalinum*.

My thanks are due to Dr F. K. Sparrow for valuable suggestions, to Miss W. Pennington who sent me the material of *Phlyctochytrium proliferum* and to Mr P. Leon for assistance with the Latin diagnoses.

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EXPLANATION OF PLATE 4

- Fig. 1. *Phlyctochytrium proliferum* sp. nov. on *Chlamydomonas*. Four chytrids each with an outer empty sporangium and a new one developing within. Photographed from fresh material. $\times 1140$.
- Fig. 2. *Rhizophidium Lecythii* sp. nov. Very young stages (spherical encysted zoospores) and pear-shaped young sporangia on the shell of *Lecythium hyalinum*. Some of the protoplasm of the rhizopod has oozed out through the open end forming a globule of naked protoplasm. Photographed from living material. $\times 875$.
- Fig. 3. Rhizopod with a mature sporangium of the chytrid on it. The zoospores are delimited. Stained in iodine. $\times 1250$.
- Fig. 4. Nearly mature zoosporangium of *Rhizophidium Lecythii* and another smaller one out of focus. The protoplasm of the sporangium has retracted from its wall. The nucleus of the rhizopod is clearly visible. Photographed from material pickled in formalin. $\times 750$.
- Fig. 5. Portion of a cell of *Lecythium* with three empty sporangia of *R. Lecythii* showing the characteristic vase-shaped form. Photographed from material pickled in formalin. $\times 714$.

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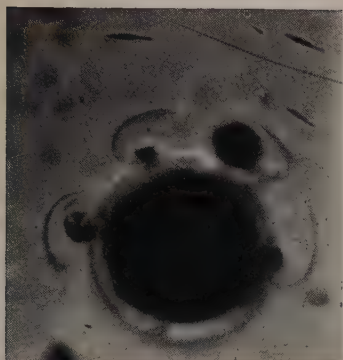


Fig. 1

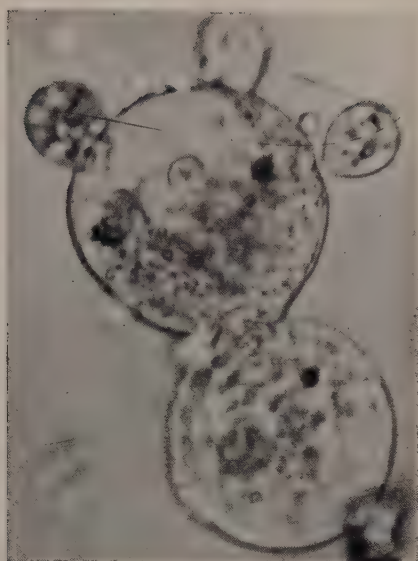


Fig. 2

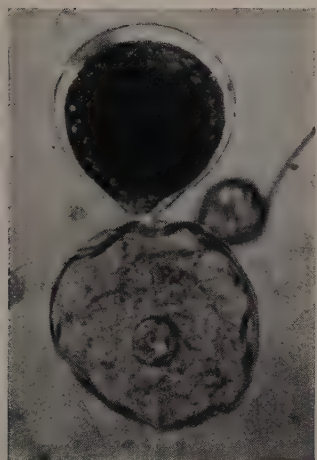


Fig. 4



Fig. 5

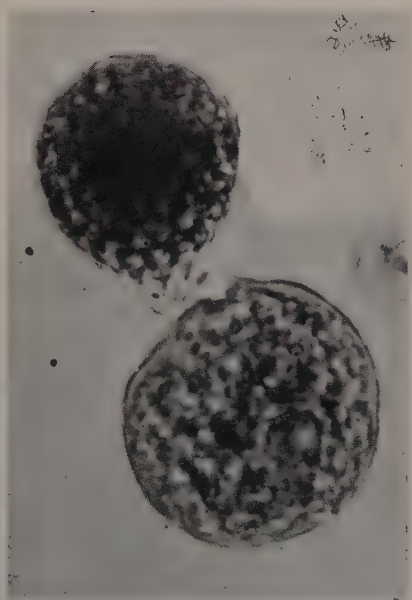


Fig. 3

LIST OF HYPHOMYCETES RECORDED FOR BRITAIN

By E. M. WAKEFIELD AND G. R. BISBY

INTRODUCTION

THIS is the third list of British Fungi compiled under the plan explained in these *Transactions*, xxiv, 126, 1940.

Most modern mycologists follow the well-known classification of the Hyphomycetes presented by Saccardo in *Sylloge Fungorum*, iv, 1886. Time certainly has not lessened the necessity recognized by Saccardo (p. 1) that a species must be sought patiently in many genera.

The difficulties of Saccardo's classification are increased when mycologists try to identify fungi growing on agar-agar and similar culture media. It is frequently difficult or impossible to decide whether a fungus on agar belongs to the Micronemeae or Macronemeae, to the Mucedinaceae (Moniliaceae) or Stilbaceae, etc. Furthermore, since agar has no 'cuticle', one of the Melanconiales in culture will appear to be one of the Tuberculariaceae or even one of the Mucedinaceae or Dematiaceae. Indeed, one frequently obtains, from a single conidium or ascospore, cultures apparently belonging to two or more genera of Hyphomycetes.

Important contributions toward an improved classification of the Hyphomycetes have been published by French mycologists. Costantin in *Les Mucédinées Simples* (1888) presented an independent classification of the fungi included by Saccardo as Mucedineae and Dematieae. Fourteen groups were keyed out on various characters, including the following: conidia or chains of conidia restricted to a special part of the conidiophore or not, conidia enveloped in mucilage or not, repent or erect conidiophores, simple or branched conidiophores, one or many conidia (or chains) at the apex, etc. Costantin grew these fungi in artificial culture whenever possible.

Bainier, from the time of Costantin's monograph until about 1910, published a long series of papers describing Hyphomycetes in culture, and a number of doctor's theses in France were devoted to various genera.

Vuillemin, especially in 1910-11, reconsidered the classification of the Hyphomycetes, pointed out clearly the methods by which chains of conidia may arise, classified the kinds of spores produced by Hyphomycetes, and differentiated the phialide.

Most mycologists outside France have followed Saccardo. Pound & Clements (*Minnesota Bot. Studies*, 1, 644-73, 1896, 726-38, 1897) criticized some of the differential characters used by Saccardo, such as those based on septation and colour of spores, and proposed a modified classification which, however, has not been followed by these authors or others.

In recent years E. W. Mason (*Annotated Accounts of Fungi received at the Imperial Mycological Institute*) has attempted to apply the more exact knowledge of the Hyphomycetes, especially that of the French mycologists. He (op. cit., List II, Fascicle 3—General Part, pp. 68-99, 1937) has pointed out that these fungi may properly be divided into two main or 'natural' groups, one with moist or slimy spores, one with dry spores; that the appearance of the conidiophore differs according to the slimy or dry character of the spores, i.e. according to the way they are freed from their points of attachment; and that the method of dispersal depends largely upon this spore-character, since spores, like seeds and pollen grains of higher plants, are adapted for dispersal (1) by water, by adhering to insects, adjacent plants, etc., or (2) by wind.

We consider Mason's distinctions of fundamental importance for students of Hyphomycetes, and have made moist spores versus dry spores the primary differentiating character. For these groups two terms are now proposed:

(1) GLOIOSPORAE, Hyphomycetes with slimy spores, that is, with spores that are freed from protoplasmic contact with the parent hyphae by slime, moisture or mucilage, which is secreted by these hyphae. This more or less mucilaginous slime usually holds several or many spores in one cluster or false head. The latter may be carried away as a whole by contact with a foreign body, or the individual spores may become separated by rain or dew. Some transitional members of the Gloiosporae may produce spores first in chains, which later 'slime down' into clusters.

(2) XEROSPORAE, Hyphomycetes with dry spores, i.e. with spores that are free to be carried away by the wind when they become cut off from their parent hyphae. The spores may be formed singly or in chains. The Xerosporae may of course have their spores disseminated by water as well as by wind, but water or slime secreted by the sporogenous hyphae is not a factor in dispersal.

We have had difficulty in deciding whether certain genera belong to the Gloiosporae or the Xerosporae, since mycologists frequently omit any reference to the method by which the spores are freed, or place a dry-spored species in a genus characterized by slimy spores, and vice versa. Also, of course, Nature presents us with the expected intermediate forms.

The advantage of having considerable stretches of alphabetical

arrangement has been maintained in this list by dividing each of these main groups into only Amerosporae, Didymosporae, Phragmosporae (including Scolecosporae, for this implied distinction frequently does not hold); there are also Dictyosporae, Helicosporae, and Staurosporae amongst the British Xerosporae and a group of Endosporae placed in the Gloiosporae. The *Mycelia Sterilia* follow, then a few records in excluded, unknown, or uncertain genera. Dermatophytes and conidial stages of Powdery Mildews are omitted.

The grouping here used has been tested for three years for the specimens of *Hyphomycetes* in the Herbarium of the Imperial Mycological Institute. Related genera are more likely to be placed near together by this arrangement. The 'ideal' classification, down to genera, has still to appear. The slowly accumulating knowledge of the life histories of *Ascomycetes* will be included in it.

Three-fourths of the British *Hyphomycetes* belong to the Xerosporae. No Coelomycete is known to produce dry-spores, except *Coryneum*, which should be removed to the *Hyphomycetes*. There is no sharp dividing line between the Gloiosporae and Melanconiales (see Mason, loc. cit. and 29, 196).

A century ago Berkeley (20) included as British just over a hundred fungi now classed as *Hyphomycetes*. Cooke (15) had about 300 in 1871, several of which were already attributed to *Ascomycetes* by the Tulasnes (114) and others.

In 1893 Masee (8), in the last 'complete' list of British species, described 624 entries. Then, as now, mycologists hoped that the Fungi Imperfecti would gradually disappear as a taxonomic group by becoming attached to *Ascomycetes*. But we still know few of the perfect stages of the 1208 *Hyphomycetes* that have been recorded in Britain up to date, and feel quite sure that many of them seldom or never produce such stages.

Berkeley (18) in 1860 again listed British *Hyphomycetes*, as did Cooke (with localities) in a series of reports in 14 (xvi-xvii). We have omitted references to these two lists unless they provide a first record. We have also omitted reference to numerous county or local lists unless a record seems worthy of mention, but have usually cited Stevenson's list (13) for Scotland, an Irish record (see list and references in 71 (xxviii, 120-66, 1910), and the Yorkshire lists (7, with references up to 1905; 35, 1905-38). *Hyphomycetes* recorded on Forays of the British Mycological Society are noted only when new or rare. It has seemed unnecessary to compile a complete list of Foray records.

The use of the words 'in', 'apud', 'as', 'ex', and 'gen.nov.' is usually self-explanatory; or see 28 (xxiv, 129). An asterisk (*) indicates figures drawn from British specimens, as does 't.', referring to a plate.

The citation of authors for accepted names is made to conform to the Rule that the Nomenclature of Hyphomycetes starts with Fries's *Systema Mycologicum*. The date for most species is 1832 (*Systema*, III, Sect. 2), but for some the date is 1829 (*ibid.* III, Sect. 1) or 1822 (*ibid.* II, Sect. 1). Several early names not accepted by Fries subsequently came into general use. The citation of authors for such names presents the inevitable difficulty. It is here assumed that any pre-Friesian name 'revived' in Wallroth, *Flora Crypt. Germania*, II, 1833, was there used first after Fries, and is cited, e.g. 'Pers. ex Wallr.' If not in Wallroth but in Chevallier, *Flore générale des environs de Paris*, 2nd ed. 1836, the citation is given 'Pers. ex Chev.' If in neither publication, the earliest citation found is used with a query, e.g. 'Pers. ex Sacc.?'

Records and names of British Hyphomycetes have accumulated for a century and a half; yet many 'species' are represented by but one collection or record. Most genera need comprehensive study, such as has recently been given to *Tubercularia*. British mycologists before 1890 gave little attention to parasitic Hyphomycetes, but combed the woods and fields for saprophytes. Until the microscope came to be used in identifying fungi about a century ago the Mycelia Sterilia were deemed important, but now are usually ignored, and we have not attempted to include all the older records of Mycelia Sterilia.

The compilers of this list are very grateful to those members of the Committee and others who have helped search the literature, and to Mr E. W. Mason for much help from his knowledge of Hyphomycetes.

The Hyphomycetes are now listed as follows:

	No.	Page
Gloiosporae: Amerosporae	218	53
Endosporae	8	62
Didymosporae	1	63
Phragmosporae	65	63
Incertae: Amerosporae	3	67
Xerosporae: Amerosporae	428	67
Didymosporae	79	84
Phragmosporae	255	87
Dictyosporae	84	97
Helicosporae	10	101
Staurosporae	8	101
Mycelia Sterilia	39	101
[Excluded, 15]; Doubtful	10	103
Total	1208	

LIST OF SPECIES

GLOIOSPORAE—AMEROSPORAE

The first two entries represent fungi characterized by slime-spores budded from cells of the hyphae. *Candida* and certain other Dermatophytes are similar. The spores have been called 'slimy radula spores', but we have no good name for the group. Yeasts differ in lacking true mycelium.

Polyspora Lini Lafferty gen. nov. in 70 (1921, 258*); 1 (II, 206). Described as one of the Melanconiales, but grows as a Hyphomycete similar to *Pullularia*. On *Linum usitatissimum*.

Pullularia pullulans (de Bary) Berkhout. 34 (XXVI, 630, on *Lolium*); 7. *Oil Col. Chem. Ass.* XXII, 184. As *Dematium*: 66 (1892, 125); 67 (I, 261); 28 (IX, 100); 79 (X, 39; XI, 55); 34 (XV, 371, 1928) with description of the perfect stage *Anthostomella pullulans* Bennett. A common saprophyte.

Acrostalagmus albus Preuss. 27 (XXXV, 8, 1897); 28 (I, 71; VI, 87 and 156; X, 174); 34 (XVII, 289). On old plants.

— **cinnabarinus** Corda. 15, 635*; 13, 292; 8, 331; 27 (XXXV, 8); 7, 334; 33 (XVI, 82); 28 (VIII, 115; IX, 174); 34 (XV, 96; XVII, 288); 75 (XXII, 123); 70 (XIX, 562); 116, 145; Vize Exs. 82. A common saprophyte; the perfect stage *Nectria inventa* Pethybr. in 28 (VI, 107*, 1920) is rarely found; 28 (XXI, 257).

Cooke and others at first followed Corda, who interpreted the heads of slime-spores as sporangia.—Berkeley, 20, 343, 1836 recorded *Botrytis lateritia* Fr.; 19, No. 238; Berk. Exs. 98; in 18, 408 he stated '*Verticillium lateritium* is a form of this [*A. cinnabarinus*] with naked spores'. Cooke 15, 635 cited '*Verticillium lateritium*.—*Botrytis lateritia*, Berk. exs. no. 98' as 'conidia' of *A. cinnabarinus*; then came the citation '*V. lateritium* Berk.': Sacc. IV, 156; 8, 330; 33 (XVI, 82); 28 (VIII, 113; XIX, 146); 27 (I, 14); 66 (CXC VII B, 7); 75 (XII, 489); 23 (XX, 799).

— **galeoides** A. L. Smith in 28 (II, 167, 1907); Sacc. XXII, 1304. On old *Pteridium*, Epping Forest.

Amblyosporium Botrytis Fres. 14 (XVI, 59); 28 (XVIII, 14). As *A. umbellatum* Harz: 14 (XIII, 51, 1884); 8, 299*. On Agarics.

Cephalosporium Acremonium Corda. 27 (XXIII, 164*, 1885); 14 (XIV, 133); 8, 292*; 28 (II, 12 and 74; VI, 14 and 87); 68 (1901, 615); 7, 329; 102 (XII, 56); 34 (XVII, 288); Mason, *Annotated Acc. List II*, Fasc. I, p. 31. On plants and in soil. See *Volutella roseola*.

— **coccidicola** Guég. 7. *Oil Col. Chem. Ass.* XXII, 184, 1939. From rain water, Wales. Doubtful; see 28 (X, 162).

— **coccorum** Petch in 28 (X, 175*, 1925); 28 (XVII, 174; XX, 12). On insects. *C. coccorum* was transferred to *Verticillium* by Westerdijk.

— **Costantinii** F. E. V. Smith in 28 (X, 90*, 1924); 112, 329. Parasitic on cultivated mushrooms, England.

— **dipterigenum** Petch in 35 (1931, 102); 28 (XVII, 174). On a fly, Yorks.

— **Eriophytis** (Massee) Petch in 28 (XVI, 66, 1931); 28 (XVII, 174); *Botrytis 'Eriophyes'* Massee apud Taylor in 74 (IV, 5*, 1909); *Verticillium Eriophytis* (Massee) Sacc. & Trott. in *Syll.* XXII, 1299. On *Eriophyes ribis* in 'big-bud' of *Ribes*.

— **humicola** Oudem. 34 (XVII, 295*, 1930). From soil, but considered a form of *C. Acremonium*.

An asterisk indicates a figure or figures drawn from British material. The figure is not necessarily on the page indicated by the asterisk. See 28 (XXIV, 127) for other explanatory details which apply here also.

- Cephalosporium lamellicola** F. E. V. Smith in **28** (x, 93*, 1924); **112**, 329. Parasitic on cultivated mushrooms, England.
- **Lefroyi** Horne in **31**. (3, LVII, 139, 1915); **28** (v, 241; x, 175; xvii, 174). On *Aleurodes*, Wisley.
- **macrocarpum** Corda. Listed **48** (II, 259, 1893). Ireland.
- **Malorum** Kidd & Beaumont in **28** (x, 110, 1924). On apple fruits.
- **muscarium** Petch in **35** (1931, 102); **35** (1932, 168); **28** (xvii, 174; xix, 8). On flies.
- **succineum** Massee & Salm. in **33** (xvi, 79*, 1902); Sacc. xviii, 512. On sheep dung, Surrey.
- **verticicola** Petch in **35** (1931, 103); **28** (xvii, 1); **35** (1936, 275). On Myxomycetes.
- sp., stage of *Cordyceps militaris*. Petch **28** (xxi, 296).
- Chaetospermum chaetosporum** (Pat.) A. L. Smith & Ramsb. in **28** (iv, 328, 1914). On old leaves.
- Chaetostroma atrum** Sacc. **37** (1909, 376). On *Cladrastis*, Kew.
- **fimicola** Massee & Salm. in **33** (xvi, 87*, 1902); Sacc. xviii, 683. On rabbit dung, Surrey.
- **Holoschoeni** Pass. **27** (LXX, 37*, 1932). On old *Scirpus*.
- Clonostachys Araucaria** Corda. **68A** (v, 126, 1857); **15**, 616*; **14** (xvi, 63); **8**, 331*; **27** (xxv, 8); **28** (III, 128); **71** (xxviii, 149). On bark and wood.
- **dichotoma** Bayliss Elliott in **28** (vi, 56*, 1918); Sacc. xxv, 710. On wood, Warwicks.
- **Simmonsii** Massee in **37** (1907, 242*); Sacc. xxv, 710; **28** (III, 35). On excrement of caterpillar, Kew.
- Corethrospis epimyces** Massee in **68** (2, v, 759*, 1885); Sacc. x, 523; **7**, 330. On old *Mycena*, Yorks.
- **paradoxa** Corda. **68** (1885, 759*); **7**, 330. On an old shoe, Yorks.
- Cylindrocolla Urticae** (Pers. ex Fr.) Bon. **14** (xvii, 13); **8**, 472*; **7**, 348; **70** (1936, 417). *Fusarium tremelloides* Grev. in **39**, t. 10, 1823; **50**, 471; **20**, 355; **15**, 559 and 704; Baxter Exs. 50; Berk. Exs. 103; Cooke Exs. 343 and II, No. 536. On *Urtica*, said to be a stage of *Calloria fusarioides*.
- Dendrodochium affine** Sacc. **8**, 466*, 1893. On dead stems.
- **album** Bayliss Elliott in **28** (vi, 57*, 1918); Sacc. xxv, 947. On fallen pinecones, Warwicks.
- **citrinum** Grove in Sacc., *Syll.* iv, 652; **27** (xxiv, 206*); **14** (xvii, 12); **8**, 466; **28** (vi, 87; xvi, 5). On wood.
- **epistroma** von Höhnelt. **28** (xxi, 260, 1938). On *Diatrypella*. The conidial stage of *Nectria Magnusiana* Rehm.
- **rubellum** Sacc. Listed **71** (xxviii, 150, 1910). Ireland.
- **rubellum** var. **Brassicae** Sacc. **28** (xxiv, 53). On *Anthriscus*, Suffolk.
- Dendrostilbella glabrovirens** A. L. Smith & Ramsb. in **28** (v, 243, 1916); Sacc. xxv, 922. On wood, Wales, associated with *Corynella*.
- Gliocladium agaricinum** Cooke & Massee in **14** (xvii, 80, 1889); Sacc. x, 528; **89**, 107; **5**, 465. On cultivated mushrooms. Petch **28** (xxii, 263) finds it apparently not a *Gliocladium*. See Petch, loc. cit., and Matruchot, *Rev. gén. Bot.* vii, 327, 1895 on *Gliocladium*.
- **album** (Preuss) Petch in **28** (xxii, 261, 1939). As *G. penicillioides*: **28** (xvi, 5; xx, 4). On Myxomycetes.
- **caespitosum** Petch in **28** (xxii, 262, 1939). On *Nectria*, Yorks.
- **luteolum** von Höhnelt. **70** (xix, 557*, 1930). In butter, Ireland.
- **macropodinum** Marchal. **28** (xxii, 258). As *G. penicillioides*: **33** (xv, 331*, 1901). On dung of kangaroo, horse, and fowl, Kew, with *Eurotium insigne*.
- **penicillioides** Corda. **27** (xxiii, 165*, 1885); **14** (x, t. 156; xiv, 133); **8**, 293; **28** (xxi, 272; xxii, 260). *G. lignicola* Grove in **27** (xxiv, 199); Sacc. x, 528; **8**, 294; **7**, 329. *Verticillium Aspergillus* B. & Br. in **19** (4, xi, 346*, No. 1384, 1873); **14** (II, 139); **8**, 329. On Thelephoraceae and Polyporaceae, 'most probably the conidial stage of *Hypomyces aureonitens*'. Petch points out that

Penicillium socium Sacc. and *P. Hypomycetis* Sacc. are meaningless names based on an inaccurate figure.

- Gliocladium roseum** (Link ex Fr.) Bainier. As *Penicillium*: **19** (2, vii, 102, No. 535, 1851); **18**, 350; **14** (xvi, 60); **8**, 303; **116**, 107; *Proc. Birmingham Nat. Hist. Phil. Soc.* xvi, 93; Vize Exs. 339. On old plants. Cooke **15**, 602 and **59** (1871) considered *P. roseum* 'an imperfect condition of *Mucor hyalinus*'; Cooke Exs. II, No. 344. Saccardo, *Syll.* iv, 155, called this *Penicillium roseum* 'Cooke, nec Link' and referred it to *Verticillium Buxi*, but Massee **8**, 330 did not agree.
- **strictum** Petch in **28** (xxi, 301, 1938). On *Fomes*; a stage of *Hypomyces Broomeanus*. *Verticillium microspermum* Sacc. is based on an erroneous figure by Cooke in **14** (xi, 48*, 1882); see Petch, **28** (xxii, 262).
- Gliomastix chartarum** (Link ex Fr.) Guég. As *Oidium*: **19** (1, i, 263, No. 130, 1838); **15**, 603; **40** (viii, 228); Vize Exs. 571. As *Torula*: **8**, 363; **116**, 148; Vize Exs. 318. On paper. Guéguen may not have had Link's species.
- **convoluta** (Harz) Mason in *Annotated Acc.* 1941. As *Torula*: **28** (vi, 157, 1919); **22** (Misc. Publ. 23, p. 27); **70** (1936, 416); **115**, 99. On potato tubers, etc.
- **convoluta** var. **felina** (Marchal) Mason, loc. cit. As *Periconia felina* March: **34** (xvii, 293*, 1930). *Graphium Malorum* Kidd & Beaumont in **28** (x, 113, 1924). In soil and apples.
- Gonytrichum caesium** Nees ex Wallr. **18**, 353; **15**, 613; **8**, 387*; **28** (ii, 56); **35** (1909, 320); Berk. **20**, 335, 1836 as *Myxotrichum*. On wood. See **102** (xvii, 121).
- **fussum** Corda. **19** (3, xv, 402, No. 1054, 1865); **15**, 613*; Cooke Exs. 348; Vize Exs. 338. On wood.
- Graphium anomalum** (Berk.) Sacc. in *Syll.* iv, 618; **8**, 457; *Stilbum* Berk. in **19** (1, 49*, No. 34, 1837); **18**, 340; **15**, 554. On *Hypnum* on wood, King's Cliffe.
- **bicolor** (Pers. ex Fr.) Sacc. **14** (xvii, 11); **8**, 457. As *Stilbum*: Berk. **20**, 330, 1836; **19** (4, vii, 431, No. 1310); **15**, 554; **13**, 265. As *Stilbella*: **71** (xxviii, 150). On wood.
- **calicioides** Cooke & Massee in **14** (xvi, 11, 1887); Sacc. x, 695; **14** (xvii, 10). On wood, said to be 'part of *Periconia calycioides* of Berkeley', q.v. under *Sporocybe*.
- **comatrichoides** Massee & Salm. in **33** (xvi, 88*, 1902); Sacc. xviii, 649. On dung of llama, Kew.
- [— **fissum** Preuss. See *Phaeoisaria* in Xerosporae—Amerosporae.]
- **flexuosum** (Massee) Sacc. in *Syll.* iv, 611; **8**, 455; **7**, 346; *Stilbum* Massee in **68** (2, v, 758*, 1885). On wood, Yorks. See *G. rigidum*.
- **glaucocephalum** (Corda) Sacc. **8**, 456; **7**, 346. As *Periconia*: Berk. **19** (2, v, 465, No. 495, 1850); **18**, 343; **15**, 565*. On old cloth and herbs.
- **graminum** Cooke & Massee in **14** (xvi, 11, 1887); Sacc. x, 695; **8**, 457. On *Gynerium*, Kew.
- **griseum** (Berk.) Sacc. in *Syll.* iv, 616; **8**, 456; **35** (1912, 92). *Pachnocybe* Berk. in **20**, 334, 1836; **19** (2, v, 465, No. 495); **15**, 551; **13**, 264. On stems.
- **Grovei** Sacc. in *Syll.* iv, 613; **14** (xvii, 11); **8**, 455; **71** (xxviii, 150); **35** (1913, 177). *Pachnocybe clavulata* Grove in **27** (xxiii, 168*, 1885); **14** (xiv, 133). On wood.
- **nigrum** (Berk.) Sacc. in *Syll.* iv, 617; **14** (xvii, 11); **8**, 457. *Stilbum* Berk. in **20**, 330, 1836; **18**, 340; **15**, 554. On old *Eriophorum*, Hunts.
- **Passerinii** Sacc. **8**, 455, 1893; **27** (L, 46); **28** (iv, 184). On dry *Rubus*.
- **penicillioides** Corda. **27** (xxiv, 205, 1886); **8**, 457. On bark; reported **70** (xix, 558*) in butter. A stage of *Ophiostoma Piceae*; see **28** (vii, 234*), Mason, *Annotated Acc.* 1937, 91, and *Leptographium Lundbergii*.
- **piliforme** (Pers. ex Fr.) Sacc. **8**, 456. As *Stilbum*: **120**, 563, 1821; **19** (1, 49, No. 33, 1837); **15**, 554; Berk. Exs. 50. On wood and herbs.
- **rigidum** (Pers. ex Fr.) Sacc. **8**, 454; **7**, 346; **28** (ix, 4). As *Stilbum*: **19** (1, 49, No. 32, 1837); **15**, 554; **13**, 265; **46** (ii, 215). On wood. Phillips **14** (iv, 82*) as *S. rigidum* was apparently *G. flexuosum* (E. W. Mason in MS.).

- Graphium stercorarium** Marchal. 33 (xvi, 88, 1902). Developed at Kew on dung of monkey from Gold Coast. Perhaps not a British species.
- **Stevensonii** (Berk. & Br.) Sacc. in *Syll.* iv, 613; 8, 456. *Stilbum* B. & Br. in 19 (5, i, 27, No. 1713, 1878); 14 (vi, 126); 13, 265. On wood, Scotland.
- **stilboideum** Corda. 19 (4, vii, 432, No. 1315, 1871); 14 (i, 20); 8, 454; 7, 346. On stems, etc.
- **subulatum** (Nees ex Fr.) Sacc. 8, 455*; 33 (xvi, 89); 7, 346. *Pachnocybe* Berk. gen. nov. in 20, 333, 1836; 18, 339; 15, 550*; 13, 264; Berk. Exs. 51. *Clavaria tenuis* Sow. in 42, t. 386, 1803. On wood, etc.
- **Ulmi** Schwarz. 31 (lxxxiii, 31*, 1928); 112, 343; 64 (xlv, 104; xlvi, 194); 76 (vi, 125); 79 (ix, 25 and 43; xi, 59); 85 (xxix, 16; xxxv, 22; xli, 18); 93, 226; 94 (xxvii, 52); 35 (1937, 287). Parasitic on *Ulmus*; a stage of *Ophiostoma Ulmi*.
- **xanthocephalum** (Ditm.) Sacc. 35 (1907, 100). In a greenhouse, Yorks.
- Haplographium bicolor** Grove in 27 (xxiii, 167, June 1885); 60 (Sept. 1885, 198* (and 234)); Sacc. iv, 305; 14 (xiv, 132; xvi, 99); 8, 381; 7, 339; Mason, *Annotated Acc.* List II, Fasc. 2, 61*. On wood.
- **delicatum** Berk. & Br. gen. nov. in 19 (3, iii, 360*, No. 818, 1859); Sacc. iv, 304; 15, 568*; 14 (xvi, 99); 46 (iii, 266); 8, 380; 7, 339; 71 (xxviii, 149); Mason, *Annotated Acc.* List II, Fasc. 2, 63*. On wood.
- **finitimum** (Preuss) Sacc. 28 (iii, 36*, 1908; vi, 55). As *H. fuscipes* (Preuss) Sacc.: 28 (vi, 59*). On leaves and cones of pine. See von Höhnelt, *Frag. Myc.* No. 89, and Melin & Nannfeldt, *Svenska Skogsvardsf. Tidskr.* 1934, 426. The figures in 28 show that the British collections belonged to the *Xerosporae*.
- **olivaceum** Cooke & Massee in 14 (xvi, 11, 1887); Sacc. x, 588; 8, 382*. On wood, Isleworth. Also one of the *Xerosporae*.
- **saponis** (Berk. & Br.) Sacc. in *Syll.* iv, 307; 14 (xvi, 99); 8, 381. *Penicillium* B. & Br. in 19 (5, vii, 130, No. 1913, 1881); 14 (x, 50). On soap. Evidently not a *Haplographium*. No specimen known.
- [— **tenuissimum** (Corda) Grove in 60 (1885, 198*), not reported for Britain; compiled as British, apparently in error, 14 (xvi, 99); 8, 381. No specimen found in Kew Herb. Von Höhnelt, *Zbl. Bakt.* lx, 10, thought it the same as *H. delicatum*.]
- Hirsutella acridiorum** Petch in 28 (xvii, 177, 1932). On a grasshopper, Yorks.
- **Aphidis** Petch in 35 (1936, 60). On *Aphis*.
- **dipterigena** Petch in 28 (xxi, 53, 1937). On *Diptera*.
- **Eleutheratorum** (Nees ex Fr.) Petch in 35 (1932, 46); 28 (xvii, 176); 70 (1936, 417). As *Isaria*: 120, 563, 1821; 40 (ix, 172). On beetles.
- **exoleta** (Fr.) Petch in 35 (1936, 251); 28 (xxiii, 142). On pupae of *Lepidoptera*.
- **lecaniicola** (Jaap) Petch in 28 (xviii, 53, 1933); 28 (xxi, 299). On scale insects; a stage of *Ophiocordyceps clavulata*.
- **subulata** Petch in 35 (1932, 48); 28 (xvii, 177). As '*Isaria floccosa* Fr.': 19, No. 1906, 1881; 14 (x, 49; xvii, 9); 8, 447. On a caterpillar, Northants.
- Hyalopus albidus** Kidd & Beaumont in 28 (x, 110, 1924). On apples.—*Hyalopus* is perhaps not distinct from *Cephalosporium*: see Petch, 28 (x, 165).
- **ater** Corda. 27 (xxiii, 166*, 1885); 14 (xiv, 133). On wood.
- **pruinosis** Marchal. 28 (x, 110, 1924); 34 (xii, 29). On apples.
- Hymenula Berkeleyi** Sacc. in *Syll.* iv, 671; 14 (xvii, 13); 8, 471; 37 (1909, 376). *H. punctiformis* Berk. & Br. [non Corda] in 19, No. 729, 1854; 15, 353. On conifers.
- **callorioides** Sacc. var. **corticis** Grove in 27 (i, 46*, 1912); 28 (iv, 284). On bark, Studley Castle.
- **constellata** Berk. & Br. in 19 (4, xvii, 138, No. 1590, 1876); Sacc. iv, 670; 8, 471. On wood.
- **herbarum** Sacc. & Roum. 7A, 300, 1904; 7, 348. On leaves, Yorks.
- [— **pezizoides** Phill. 14 (xvii, 13). This is apparently a *nomen nudum*.]

- [**Hymenula Platani** (Mont.) Lév. 14 (viii, 111). This is *Gloeosporium Platani* (Mont.) Oudem.]
- **rubella** Fr. 14 (xvii, 13, 1888); 8, 471. On stems.
- **vulgaris** Fr. 14 (xvii, 13, 1888); 8, 471. On stems.
- Illosporium carneum** Fr. 19 (2, v, 466, No. 497, 1850); 15, 561, 13, 268; 8, 468; 7, 347; 119, 633; Berk. Exs. 293; Cooke Exs. II, No. 535; Vize Exs. 352. On *Peltigera*, stage of *Nectriella Robergei*; see 28 (xxi, 270).
- **coccineum** Fr. 19, No. 499, 1850; 15, 561; 8, 468; 119, 633. On Lichens.
- **corallinum** Rob. 19, No. 498, 1850; 15, 561; 8, 468. On Lichens. It is sometimes placed as a var. of *I. roseum*, e.g. 119, 632.
- [— **Curreyi** (Berk.) Sacc. This is *Ctenomyces serratus* Eidam, see 27 (xlii, 55).]
- **roseum** Fr. 58, 144; 20, 328; 15, 560*; 13, 267; 8, 468*; 7, 347; 119, 631; Cooke Exs. II, No. 337. As *Palmella*: 39, t. 51, 1823; 51, 323. On lichens.
- Leptographium Lundbergii** Lagerberg & Melin in *Svenska Skogsvardsf. Tidskr.* 1927, 248. 28 (vii, t. 9) is considered to illustrate this species.
- Menispora ciliata** Corda. 15, 614, 1871; 40 (v, 9 and 325); 48 (ii, 259); 8, 386*; 35 (1908, 411); 28 (x, 7); Vize Exs. 342. On wood.
- **lucida** Corda. 19 (2, vii, 101, No. 530, 1851); 15, 614*, 13, 285; 8, 385*; 71 (xxviii, 149). On wood.
- Menoidea Abietis** Mangin & Hariot. 28 (xiii, 155*, 1928). On dead leaves of *Abies*, Scotland and Isle of Man.
- Myrothecium Cookei** Sacc. & Syd. in *Syll.* xiv, 1129. *M. cinereum* Cooke [non Pass.] in 14 (xx, 113, 1892); Sacc. xi, 656. On *Oncidium*, Ireland.
- **inundatum** Tode ex Fr. 14 (xvii, 16, 1888); 8, 490*; 48 (xvii, 27). On old agarics.
- **roridum** Tode ex Fr. 20, 323, 1836; 15, 559*; 13, 267; 46 (iv, 148); 8, 490; 28 (xx, 242*); 85 (xli, 18); Cooke Exs. II, No. 628. *M. Carmichaelii* Grev. in 39, t. 140, 1823. On old plants; parasitic on *Viola*.
- Oospora abortifaciens** (Quekett) Sacc. & Vogl. in *Syll.* iv, 25; 8, 281; 28 (xix, 146, in air). *Ergotoetia* Quekett in 45 (xviii, 471*, 1841). *Oidium* B. & Br. in 19 (2, vii, 178, No. 545, 1851); 15, 772. On grasses infected with *Claviceps*; some of the records probably refer to *Sphacelia segetum*.—A few of the species of *Oospora* below are Xerosporae.
- **aequivoca** (Corda) Sacc. & Vogl. 14 (xvi, 57); 8, 278. *Oidium aequivocum* (Corda) B. & Br. in 19 (3, iii, 361, No. 821, 1859); 15, 604. On *Polyporus*, Dorset.
- **candidula** Sacc. 27 (xxiii, 163, 1885); 14 (xiv, 133); 8, 278; 37 (1907, 242); 35 (1914, 16); 70 (1936, 410); 28 (xxiv, 55). On *Nectria* and twigs.
- **carneola** Sacc. 75 (xii, 489, 1912). On chilled meat.
- **coccinea** Sacc. & Vogl. 35 (1900, 8); 28 (i, 150); 7, 327. On cat's dung, Yorks.
- **Cookei** Sacc. in *Syll.* x, 513. *O. inaequalis* Cooke & Massee [non (Corda) Sacc. and Vogl.] in 14 (xvi, 10, 1887); 8, 281; 89, 176. On bamboo, Kew.
- **equina** (Desm.) Sacc. & Vogl. 28 (iv, 327, 1914). On skin and bones of a cat, Worcester.
- **fasciculata** (Grev. ex Berk.) Sacc. & Vogl. in *Syll.* iv, 11; 8, 277. *Acrosporium* Grev. in 51, 469, 1824. *Oidium* Berk. in 20, 349; 15, 604; 13, 280. On decaying oranges.
- **favorum** (Berk. & Br.) Sacc. & Vogl. in *Syll.* iv, 22; 8, 279; 74 (vii, 157*). *Oidium* B. & Br. in 19, No. 762*, 1854; 15, 604. On honeycomb.
- **fimicola** (Cost. & Matr.) Cub. & Megl. 85 (xxviii, 51, 1931; xxix, 21; xxxv, 27; xxxix, 23); 31 (3, xcvi, 444); 22 (Bull. 79, p. 92). On mushroom beds. This fungus is xerosporous.
- **fulva** (Kunze ex Fr.) Sacc. & Vogl. 8, 280. As *Oidium*: Berk. 20, 348, 1836; 15, 603*; 13, 280; Berk. Exs. 295. On decayed wood.
- **hyalinula** (Sacc.) Sacc. 27 (l, 11, 1912); 28 (xxiv, 55). On old *Fraxinus*.
- **lactis** (Fres.) Sacc. 14 (xvi, 57, 1887); 66 (1892, 125); 8, 277; 23 (xii, 643); 103 (v, 222); 33 (xxxii, 531); 28 (ix, 171); 70 (xix, 562). In milk, cheese, butter, and slime-flux. See *Geotrichum candidum* (p. 72).

- Oospora lateritia** Sacc. 28 (II, 167, 1907). On leaves, Luton.
- **Ludwigii** (Hans.) Sacc. & D. Sacc. 28 (IX, 177, 1924). In slime-flux, Cambs.
- **Mali** Kidd & Beaumont in 28 (X, 109, 1924). On apples.
- **microsperma** (Berk. & Br.) Sacc. & Vogl. in *Syll.* IV, 22; 8, 279; 71 (XXVIII, 148); 35 (1936, 275). *Oidium* B. & Br. in 19 (4, XI, 346, No. 1387, 1873). On fir bark.
- **ochracea** (Corda) Sacc. & Vogl. 27 (I, 11, 1912); 28 (III, 367; VIII, 254). On jam, etc.
- [— **porriginis** Sacc. 8, 278; previous records as *Oidium*. This is *Achorion Schoenleini*, a Dermatophyte.]
- **pullulans** (Lindner) Lindau. Recorded 115, 94, 1937.
- [— **pulmonea** (Bennett) Sacc. See C. W. Dodge, *Medical Mycology*.]
- **pustulans** Owen & Wakefield in 37 (1919, 297*); 37 (1923, 273*); 31 (LXXIII, 355); 112, 328; 79 (V, 28); 65 (XXX, 343); 28 (XIV, 151); 24 (XV, 191); 71 (XL B, 54); 22 (Bull. 79, p. 27); 85 (XXIX, 17); first attributed to *Spicaria Solani* Harting, 25 (XV, 524). On potato tubers, causing Skin Spot.
- **rosella** Grove in 27 (XXIII, 163, 1885); Sacc. IV, 19; 14 (XVI, 57). On horse dung, Birmingham.
- [— **scabies** Thaxt. is *Actinomyces scabies*, a Schizomycete.]
- **suaveolens** (Lindner) Lindau. Recorded 115, 94, 1937.
- **sulphurella** Sacc. & Roum. 28 (II, 167, 1907); 27 (I, 11). On bark and wood.
- **Trichiae** Petch in 35 (1936, 59). On *Trichia verrucosa*, Yorks.
- **variabilis** (Lindner) Lindau. 102 (XII, 55*, 1914); 115, 94; 75 (XXII, 123) as *Monilia*. In soil, etc.
- Scopularia venusta** Preuss. 27 (LXIV, 107*, 1926). On pine cones.
- Sphacelia Curreyana** Grove in 27 (I, 46, 1912); Sacc. XXV, 952; 28 (IV, 184). On sclerotia of *Sclerotinia Curreyana* in *Juncus*, Warwicks. A *Sphacelia* on *Juncus* was recorded as '*Claviceps Junci*' Adams in 48 (XVI, 168*, 1907).
- **segetum** Lév. 14 (XVII, 13); 8, 470; 28 (XXI, 300); *Farinaria Poae* Sow. in 42, t. 396, 1803. This stage of *Claviceps purpurea* is seldom cited by name.
- **typhina** Sacc. 14 (XVII, 13, 1888); 8, 470; 28 (XXI, 294). A stage of *Epichloe* on grasses.
- Sporocybe atra** (Desm.) Sacc. 14 (XVII, 10, 1888); 8, 453. On grass.
- **Azaleae** (Peck) Sacc. 28 (XIV, 171, 1929; XV, 5); 65 (XXX, 347, 1931); 22 (Bull. 79, p. 100); 71 (XLI B, 54); 79 (XIII, 35); 93, 197. On *Rhododendron*. See Mason, *Annotated Acc.* 1941.
- **brassicicola** (Berk. & Br.) Sacc. in *Syll.* IV, 606; 14 (XVII, 10); 8, 453. *Periconia* B. & Br. in 19 (4, XV, 33*, No. 1452, 1875); 14 (III, 181); Cooke Exs. 647 and II, No. 165. In old cabbage stalks.
- '**byssoides** Bon.' 8, 452*, 1893. On stems. Probably an erroneous compilation of *Periconia byssoides*.
- **calicioides** Fr. 20, 333, 1836; 8, 453. *Periconia calicioides* (Fr.) Berk. in 18, 343; 15, 565; 13, 268; 48 (XVII, 26). On stems. Fries had an Ascomycete: see 100 (XII, 220) and *Ann. Épiphyt.* XVI, 267. Cooke & Massee proposed *Graphium calicioides* (q.v.) for part of the British records.
- **cuneifera** (Berk. & Br.) Sacc. in *Syll.* IV, 606; 14 (XVII, 10); 8, 453. *Stilbum* B. & Br. in 19 (4, XV, 33*, No. 1451, 1875); 14 (III, 181). On old cabbage stalks, Bathaston.
- **Phillipsii** (Berk. & Leight.) Sacc. in *Syll.* IV, 609; 8, 453; 7, 346; *Periconia* Berk. & Leight. apud B. & Br. in 19 (4, XV, 33, No. 1453, 1875); 14 (III, 124* and 182); Cooke Exs. II, No. 166. On soil.
- Stachybotrys alternans** Bon. 14 (XVI, 97, 1888); 8, 368; 27 (XXXV, 8); 28 (I, 184); 68 (1901, 615); 116, 147. On paper, etc.—See von Höhnelt, *Zbl. Bakt.* 2. Abt. LX, 14, 1923, and *Periconia* below (p. 79).
- **asperula** Massee in 14 (XVI, 26, 1887); Sacc. X, 577; 14 (XVI, 98); 8, 369*. Kew, on paper from Ceylon. See *S. lobulata*. Petch 28 (XV, 249) redescribed the type as a Ceylon fungus.

- Stachybotrys atra** Corda. **19** (3, III, 360, No. 817, 1859); **15**, 567*; **48** (II, 259); **8**, 368; **7**, 337; **116**, 148; Cooke Exs. 640; Vize Exs. 350. On paper, etc.
- **dichroa** Grove in Sacc., *Syll.* IV, 270; **27** (XXIV, 201*); **8**, 368; **7**, 338. On decaying stems.
- **lobulata** (Berk.) Berk. in **18**, 343; Sacc. IV, 269; **15**, 567; **73** (1877, t. 27); **48** (II, 259); **27** (L, 16, with note that *S. asperula* is a synonym); **35** (1912, 91); *Sporocybe* Berk. in **19** (I, VI, 434*, No. 228, 1841). On damp cloth, etc.
- **verrucosa** Cooke & Massee in **14** (XVI, 102, 1888); Sacc. X, 577. On paper, Kew.
- Stachylidium bicolor** Link ex Fr. **120**, 553, 1821; **20**, 341; **71** (XXVIII, 149). On stems.
- **cyclosporium** Grove in **27** (XXII, 199, 1884); Sacc. IV, 332; **27** (XXIII, 167*); **8**, 387*; **48** (V, 234); **7**, 339; **37** (1911, 377). On branches, etc.
- **extorres** Sacc. **27** (XXIV, 202, 1886); **40** (IX, 172); **8**, 388; **7**, 339; var. *majus* reported **34** (XVII, 290). On wood, etc.
- Stilbum acicula** (Berk.) Sacc. in *Syll.* IV, 569; **14** (XVII, 9); **8**, 444; **35** (1905, 189). *Pachnocybe* Berk. in **20**, 334, 1836; **15**, 551. On stems.—*Stilbum* Tode was based on six species. The first one, *S. vulgare*, was considered by Juel to be a Basidiomycete. Lindau, *Nat. Pflanzenfam.* 1900, chose this as the type of *Stilbum*, and proposed *Stilbella* as the name for the Hyphomycete. But *Stilbum* of Fries's *Systema* is definitely a Hyphomycete.
- Without attempting to decide whether *Stilbum* or *Stilbella* should now be used, we are listing the British species as *Stilbum*, for some of them have not been transferred to *Stilbella*. It should be noted, however, that Rea **2**, 728, accepted the name *Stilbum* as that of a Basidiomycete.
- **aurantiacum** Bab. ex Berk. in **19** (I, VI, 432*, No. 223, 1841) [nomen nudum Babington in *Proc. Linn. Soc. Lond.* I, 32, 1839]; Sacc. IV, 573; **15**, 553; **8**, 445; **7**, 344. *Stilbella* Lindau, 1908; **28** (XXI, 262*) as conidial stage of *Sphaerostilbe aurantiaca*. On *Ulmus*. See Wollenweber, *Fus. autogr. del.* t. 789.
- **bulbosum** Tode ex Fr. **120**, 564, 1821. On old plants.
- **citrinellum** Cooke & Massee in **14** (XVI, 81, 1888); Sacc. X, 684; **8**, 446*. On *Lycopodium*, Kew.
- **erythrocephalum** Ditm. ex Fr. **20**, 330, 1836; **15**, 553; **27** (L, 55*); **8**, 444; **33** (XVI, 86); **7**, 344. As *Stilbella*: **71** (XXVIII, 150); **35** (1937, 287). On dung of various animals.
- **fasciculatum** Berk. & Br. in **19** (2, V, 465, No. 492, 1850); Sacc. IV, 570; **19**, No. 1148; **15**, 553; **8**, 445; **7**, 344. *Stilbella* [comb. nov.?] in **115**, 103. On wood.
- **finetarium** (Pers. ex Fr.) Berk. & Br. in **19** (2, V, 465, No. 494, 1850); **15**, 553; **48** (II, 258); **8**, 445; **7**, 344. As *Stilbella*: **35** (1937, 287). On dung.
- **Kervillei** Quél. **27** (LXIX, 205, 1931); **35** (1932, 133). As *Stilbella*: **28** (XVII, 175; XXI, 53). On *Hirsutella* on flies. Petch later, **28** (XXIII, 140), considered that *Stilbum ramosum* Peck is the earliest valid name, and that *Stilbella setiformis* (Vahl) Petch in **28** (XVIII, 55) is a synonym.
- **leiopus** Ehrenb. ex Wallr. **35** (1901, 342); **28** (I, 194); **7**, 344; **115**, 103 as *Stilbella*. On mouse dung.
- **melleum** Berk. & Br. in **19** (4, XVII, 141*, No. 1609, 1876); Sacc. IV, 565; **14** (V, 57; XVII, 8); **8**, 446. On bark.
- **nigripes** Cooke in **14** (XVI, 81, 1888); Sacc. X, 683; **14** (XVII, 9). On oak leaves, Scotland.
- **orbiculare** Berk. & Br. in **19** (5, I, 28*, No. 1714, 1878); Sacc. IV, 566; **14** (VI, 127); **13**, 265; **40** (V, 8); **8**, 443. On *Lindbladia*, Scotland.
- **pellucidum** Schrad. ex Fr. **20**, 330, 1836; **18**, 340; **15**, 555; **13**, 265; **8**, 444; **7**, 344; **35** (1937, 283) as *Stilbella*; **27** (LXXXV, 226). On wood and fungi.
- **ranigenum** (Berk. & Br.) Sacc. in *Syll.* IV, 573; **14** (XVII, 9); **8**, 446 as *S. 'ramigenum'*. *Acremonium* B. & Br. in **19** (4, VII, 432*, No. 1319, 1871); **14** (I, 21). The type and only collection is on a dead frog; later references erroneously state 'on rotten branches'.

- Stilbum sphaerocephalum** Massee in 37 (1907, 243*); Sacc. xxii, 1437; 28 (iii, 37). On *Philodendron*, Kew.
- [— **tetraonum** Cooke nomen nudum, 14 (xvii, 9). On grouse dung, Rannoch.]
- **turbinatum** Tode ex Fr. 20, 330, 1836; 19 (4, vii, 431, No. 1310); 15, 555; 8, 445. On wood, etc.
- **vaporarium** Berk. & Br. in 19 (2, v, 465, No. 493, 1850); Sacc. iv, 570; 18, 339; 15, 553; 8, 445. On wood in hot-houses.
- [— **vulgare** Tode ex Fr. 120, 564, 1821; 51, 448; 20, 330; 15, 555*; 13, 265; 40 (viii, 228); 8, 444; 7, 344. On stems. 2, 728, as a Basidiomycete.]
- Syngliocladium araneorum** Petch gen.nov. in 28 (xvii, 177, 1932). On a spider, Horsham.
- Synsporium biguttatum** Preuss. 102 (xii, 46*, 1914); 28 (iv, 165). In soil. See E. W. Mason, *Annotated Acc.* Fasc. II, List 3.
- Tilachlidium cinnabarinum** Kidd & Beaumont in 28 (x, 113, 1924). From apples.
- **subulatum** A. L. Smith in 28 (iii, 122*, 1909); Sacc. xxii, 1439. On debris.
- **tomentosum** (Schrader ex Fr.) Lindau. 28 (v, 17). As *Stilbum*: 39, t. 281, 1827; 20, 330; 15, 552; 13, 264; 27 (xvii, 335); 48 (ii, 258); 8, 444; 7, 343; Vize Exs. 354. Var. *ovalisporum* A. L. Smith in 28 (ii, 26, 1903); 28 (xvi, 15). *Isaria microscopica* Grev. in 39, t. 3, 1823; 51, 466; 14 (xvii, 10); 8, 449. On Myxomycetes.
- Tolypomyria microsperma** (Corda) Sacc. 27 (lxiv, 108*, 1926). On pine cone, Warwicks.
- Trichoderma album** Preuss. 102 (x, 461*, 1912); 28 (iv, 181; xxiii, 151). In soil. Evidently not a *Trichoderma*.
- **Koningi** Oudem. 102 (x, 461*, 1912); 28 (iv, 181; vi, 370; xxiii, 149); 34 (xv, 96); 82 (xiv, 43); 116, 143. In soil, etc. Hardly distinct from *T. viride*.
- **viride** Pers. ex Fr. 42, t. 378, 1803; 120, 560; 39, t. 271; 51, 465; 20, 323; 114 (iii, 30); 15, 774; 68 (1901, 615); 84 (iii, 188); 22 (Bull. 117, p. 92); 28 (xxiii, 149*); Cooke Exs. II, No. 338. As *T. lignorum*: 8, 295; 28 (ix, 174; xxi, 290); 66 (cxcvii B, 7; ccxxx B, 99); 67 (cv B, 375; cxii B, 210); 33 (xlv, 735*); 70 (xix, 557*); 104 (xii, 313). *Eidamia viridescens* Horne & Williamson in 33 (xxxvii, 430*, 1923); 33 (xlvi, 391); 66 (ccxxx B, 99); 116, 87. Common on wood, in soil, etc.; a stage of *Hypocrea rufa*. A fungus agreeing with *T. viride* was also cultured from *Hypocrea gelatinosa*.
- [**Tubercularia Ligustri** Cooke in 14 (xvi, 49) is *Dendrophoma pleurospora* Sacc., teste Petch 28 (xxiv, 53).]
- Tubercularia versicolor** Sacc. Cooke 14 (xvii, 12, 1888); 8, 463. On *Buxus*, Kew. Cooke's specimens apparently were not kept, but Petch 28 (xxiv, 53) reports that *T. versicolor* is not uncommon.
- **vulgaris** Tode ex Fr. Petch 28 (xxiv, 33, 1940) finds practically all British records of *Tubercularia* to be this species. The records were published under the following names: *T. Aesculi* Opiz, *T. Aquifolia* Cooke & Massee, *T. Berberidis* Thuem., *T. conorum* Cooke & Massee, *T. granulata* Pers., *T. nigricans* (Bull.) Gmel., *T. Sambuci* Corda, and *T. vulgaris* Tode; the following records are separated by Petch as 'Form minor Link': *T. Brassicae* Lib., *T. confluens* Pers., *T. Euonymi* Roum., *T. expallens* Fr., *T. herbarum* Fr., *T. minor* Link and its var. *Syringae* Cooke & Massee, *T. sarmentorum* Fr., and *T. subpedicellata* Schw.—Dillenius, *Hist. Muscorum*, t. 18, 1741 apparently figured *T. vulgaris* as *Tremella purpurea*, and most subsequent British mycologists have included it as *Tubercularia* or as *Nectria cinnabarina*.
- Verticillium agaricinum** Corda. 15, 777, 1871; 14 (xi, 45*); 8, 328; 7, 334; 28 (xxi, 273). On *Russula* and *Lactarius*, a stage of *Hypomyces ochraceus*. See *Blastotrichum*.
- 'albium Sacc.' Massee 37 (1909, 376). On gorse, Kew. No other reference to this name was found.
- **albo-atrum** Reinke & Berth. 25 (x, 256, 1910; xi, 447; xii, 355 and 466; xvi, 584; xvii, 604); 33 (xxvi, 129; xxxvii, 519); 70 (xv, 63*); 34 (ix, 116); 28

- (III, 223); **34** (VIII, 13; IX, 116); **82** (VI, 26; VII, 32; XIII, 38; XIV, 36); **23** (XXX, 450; XLIII, 121); **77** (for 1924, 1933, 1935, 1936); **24** (x, 291); **65** (xxx, 342); **79** (I, 29; IV, 28; V, 29; VIII, 24; XI, 48); **22** (Misc. Publ. 21, 52, 79); **112**, 330; **85** (1928, 1934 to date); **93**. On potato, tomato, etc. Massee **31** (3, xvii, 708, 1895) may have had *V. albo-atrum* on tomato. See *V. Dahliae*.
- Verticillium allochromum** (Link ex Fr.) Corda. **120**, 553, 1821 as *Botrytis*. On stems.
- **ampelinum** Cooke & Massee in **14** (xvi, 79, 1888); Sacc. x, 545; **8**, 327. On vine stems, Kew.
- **botryoides** Sacc. **28** (xvi, 15, 1931). On *Leocarpus fragilis*, Yorks.
- **Buxi** (Link ex Fr.) Auersw. & Fleisch. **14** (xvi, 63, 1887); **8**, 330; **35** (1914, 16); **70** (1936, 412). On box leaves. See *Gliocladium roseum*.
- **candelabrum** Bon. **14** (xvi, 62, 1887); **8**, 326; **7**, 334; **28** (iv, 205). On old wood, etc.
- **cinerescens** Wollenw. **34** (xxii, 630, 1935); **31** (3, xcvi, 267; xcix, 82); **104** (xiv, 216); **82** (xx, 46; xxi, 46); **84** (vi, 89); **93**, 187. In wilt of *Dianthus*. —The species was transferred to *Phialophora* by van Beyma in *Antonie van Leeuwenhoek* vi, 47, 1939.
- **compactiusculum** Sacc. **14** (xvi, 63, 1887); **8**, 327. On old plants.
- **crustosum** (Fr.) Rabenh. As *Botrytis*: **20**, 343, 1836; Berk. Exs. 333. On Umbelliferae.
- **Dahliae** Kleb. **77** (1928, 84); **112**, 331; **70** (v, 30; xi, 53); **22** Bulls. 70 and 79; **28** (xiv, 164); **65** (xxx, 340); **77** (1932, 48; 1933, 82); **93**; first reported but not identified **104** (iv, 221, 1925); **77** (1925, 126; 1927, 81). In wilt of various plants. Some of the records of *V. albo-atrum* may belong here; or *V. Dahliae* may be a synonym, since it is said to differ from *V. albo-atrum* only in producing sclerotia.
- **distans** Berk. & Br. in **19** (2, vii, 102*, No. 534, 1851); Sacc. iv, 151; **15**, 599; **8**, 327. On stems. Spores said to become two-celled.
- **epimyces** Berk. & Br. in **19** (2, vii, 102*, No. 533, 1851); Sacc. iv, 154; **15**, 599; **8**, 329; **7**, 334; **28** (vii, 10). On *Elaphomyces*, etc.
- **globuliforme** Bon. var. **ellipsoideum** Grove in **27** (lvi, 345*, 1918); **28** (vi, 373). On *Fucus*, Warwicks.
- **lactescens** Sacc. in Syll. iv, 153, based on unnamed conidial state said by Plowright **14** (xi, 47*, 1882) to belong to *Hypomyces terrestris*; **14** (xvi, 63); **8**, 328. Petch **28** (xxi, 273) places *H. terrestris* as a synonym of *H. ochraceus*, with *V. agaricinum* as the name of the conidial stage.
- **Malthousei** Ware in **33** (xlvii, 781, 1933); **85** (1934 to 1938; fungus mentioned as N.sp. 1931–33). On cultivated mushrooms.
- **Marquandii** Massee in **28** (I, 24, 1898); Sacc. xvi, 1037; **35** (1910, 25; 1911, 171). On *Hygrophorus*.
- **nanum** Berk. & Br. in **19** (2, vii, 101*, No. 532, 1851); Sacc. iv, 152; **15**, 599; **48** (ii, 259); **8**, 328. On pears.
- **nigrescens** Pethybr. in **28** (vi, 117*, 1919); Sacc. xxv, 706. On potato, Ireland.
- **nubilum** Pethybr. in **28** (vi, 117*, 1919); Sacc. xxv, 706. On potato, Ireland.
- **quaternellum** Grove in **27** (xxii, 197*, 1884); Sacc. iv, 154; **8**, 329; **37** (1909, 376, on blackberry). On *Mycena*.
- **Rexianum** Sacc. **14** (xxii, 44, 1893); **71** (xxviii, 148). On *Physarum*.
- **tenuissimum** Corda. **28** (vi, 55, 1918). On timber.
- **terrestre** (Pers. ex Fr.) Sacc. **8**, 327. As *Stachylidium*: **120**, 553, 1821; **39**, t. 257; **20**, 341. As *Botrytis*: **19** (I, vi, 437*, No. 240, 1841); **15**, 592; **13**, 275. *S. candidum* Grev. in *Mem. Wern. Nat. Hist. Soc.* I, 72*, 1822; **51**, 466. On soil and old wood.
- **tubercularioides** Speg. Cited by Petch **28** (xxi, 261, 1938) as conidia of *Nectria ochroleuca*.
- **Vilmorinii** (Guég.) 'Westerdijk & van Luijk' (stated to be a *Verticillium* in *Meded. Phytopath. Lab. Willie Commelin Scholten* viii, 50, 1924, but the combination was not actually made); **112**, 331; **79** (vi, 28; xi, 56); **22** (Misc. Publ. 52,

- 70, 79); *Cephalosporium Asteris* Dowson in 56 (XLVIII, 57*, 1923). In wilt of *Aster*.
- [*Verticillium Vizei* B. & Br. in Vize Exs. 247 and 14 (xvi, 63) is a nomen nudum.]
- Volutella Arundinis*** (Desm. ex Fr.) Sacc. 8, 475. As *Psilonia*: 19 (i, 49, No. 35, 1837, and No. 551); 15, 624; Berk. Exs. 102. On reeds, etc.
- ***Boydiana*** Sacc. in *Syll.* x, 718; *V. citrina* Cooke & Massee [non Ellis & Ev.] in 14 (xviii, 74, 1890). On *Trollius*, Scotland.
- ***Buxi*** (DC ex Fr.) Berk. & Br. in 19 (2, v, 465, No. 495, 1850); Sacc. iv, 685; 8, 475. As *Fusisporium*: 20, 352, 1836; Berk. Exs. 55. As *Chaetostroma*: 19, No. 898; 15, 788; Cooke Exs. 553 and II, No. 160. On box leaves.
- ***ciliata*** Fr. 19 (2, v, 465, No. 495, 1850); 15, 556; 13, 266; 8, 473*; 60 (1901, 28*); 33 (xvi, 88); 7, 348; 71 (xliib, 54). *Psilonia rosea* Berk. in 20, 353, 1836; Berk. Exs. 56. On old plants. See *V. roseola*.
- ***ciliata*** var. ***stipitata*** (Lib.) Sacc. 8, 473; 19 (4, vii, 431, No. 1312, 1871) as *Chaetostroma stipitatum* (Lib.) Corda; *Volutella stipitata* (Lib.) B. & Br. ex Cooke in 14 (i, 20, 1872). On old plants.
- ***discoidea*** (Berk. & Br.) Sacc. in *Syll.* iv, 687; 8, 475. *Psilonia* B. & Br. in 19 (3, xviii, 122*, No. 1150, 1866); 15, 624. Var. *lateritia* B. & Br. was proposed in 19, No. 1319. On wood.
- ***Festucæ*** (Lib.) Sacc. 8, 476, 1893; 40 (ix, 41, 1887) as var. *bacillaris* nomen nudum. On *Festuca*.
- ***gilva*** (Pers. ex Fr.) Sacc. 8, 475; 28 (vi, 87). As *Psilonia*: 20, 353, 1836; 15, 623; Berk. Exs. 101. On old plants.
- ***Hyacinthorum*** (Berk.) Berk. & Br. in 19 (2, v, 465, No. 495, 1850); 15, 557; Sacc. iv, 684; 14 (xvii, 13); 8, 474; 71 (xxviii, 150). *Psilonia* Berk. in 20, 353, 1836. On old bulbs, etc.
- ***longipila*** A. L. Smith & Ramsb. in 28 (vi, 53, 1918); Sacc. xxv, 958. On *Ulex*, Scotland.
- ***melaloma*** Berk. & Br. in 19 (2, v, 465*, No. 496, 1850); Sacc. iv, 688; 15, 557; 8, 476. On *Carex*.
- ***nivea*** Sacc. 8, 474, 1893; 37 (1911, 377). On bark and *Scleroderma*.
- [***Phaii*** Pim. 71 (xxviii, 150). The original description has not been seen.]
- ***roseola*** Cooke in 14 (i, 20, 1872); Sacc. iv, 684; 8, 474; 71 (xxviii, 150); *Proc. Birmingham Nat. Hist. Phil. Soc.* xvi, 93, with *Cephalosporium Acremonium* stage. In soil, etc.; perhaps only a form of *V. ciliata*.
- ***setosa*** (Grev. ex Fr.) Berk. & Br. in 19 (2, v, 465, No. 495, 1850); 15, 557*; 13, 266; 8, 474; 7, 348; 71 (xxviii, 150; Cooke Exs. II, No. 159. *Aegerita* Grev. in 39, t. 268, 1823; *Psilonia* Berk. in 20, 353, 1836. On stems, etc.

GLOIOSPORAE—ENDOSPORAE

The spores are interpreted as 'slime-spores', although they often persist in chains.

- Chalara fungorum*** Sacc. 27 (LXXIII, 188, 1935); 1 (II, 116*). On *Sphaeronemella* on *Sparassis*, Norfolk.
- ***fusidioides*** Corda. 35 (1936, 59); 28 (xxiv, 56). On *Nectria coccinea*, Yorks. Pim 71 (2, iv, 27) reported *C. Cocos* (nomen nudum) 'doubtfully distinct from *C. fusidioides*'.
- ***longipes*** (Preuss) Berk. & Br. in 19 (5, vii, 130, No. 1911, Feb. 1881); 14 (x, 50); Sacc. iv, 335; 8, 389*; 35 (1909, 419). As *Cylindrosporium*: 19, No. 1705, 1878; 14 (vi, 126). Two British collections reported; the first, on walnut shell, Scotland, was apparently *Chalaropsis thielavioides*, see 104 (xiii, 104). The Yorkshire collection was on decaying bark.
- ***longissima*** Grove in 27 (xxiii, 167*, 1885); Sacc. iv, 334; 14 (xiv, 133); 8, 388. On wood, Warwicks.
- [***minuta*** Trail, nomen nudum in 40 (ix, 41).]
- Chalaropsis thielavioides*** Peyron. 77 (1931, 146; 1932, 74); 22 Bull. 79; 104 (xiii, 81*); 28 (xix, 158); 93, 98. On *Fuglans*, etc.

Sporendonema casei Desm. ex Fr. 20, 351, 1836; 40 (iv, 347). *Torula Sporendonema* B. & Br. in 19 (2, v, 460, No. 462, 1850); 15, 478; 13, 229; 71 (2, iv, 27). As *Oospora crustacea* (Bull.) Sacc.: 8, 280; 48 (v, 9); 7, 327. On cheese, etc. Early records of *Mucor caseus*, e.g. 38 (Ed. 3, iv, 402, 1796); 55 (ii, 722), may have referred to this fungus.—See Beauverie, *Études Polymorphisme Champ.*, 1900. Most records as *Sporendonema casei* belong to the dry-spored genus *Scopulariopsis*.

Sporoschisma mirabile Berk. & Br. gen.nov. in 19 (2, v, 461, No. 467, 1850); Sacc. iv, 486; 15, 482*; 14 (xvi, 110); 13, 321; 73 (1877, 5); 40 (v, 277; vii, 327); 8, 422*; 46 (ii, 346); 28 (i, 164). *Nomen nudum* in 31 (1847, 540). On old wood.

Thielaviopsis basicola (Berk. & Br.) Ferraris in *Fl. Ital. Crypt.* 1, vi, 233, 1912; 67 (cxix, 210); 79 (xi, 49; xii, 28); 23 (xliii, 124); 93; 22 (Bulls. 79 and 117). *Torula* B. & Br. in 19 (2, v, 461*, No. 465, 1850); 15, 477; 14 (xvi, 97); Sacc. iv, 257; 8, 360. As *Thielavia* in error: 23 (xv, 203 and 439; xxi, 421); 35 (1909, 238*); 37 (1912, 44); 33 (xxix, 483*); 25 (xvii, 464; xxi, 203; xxii, 110); 82 (xi, 74; xii, 26); 79 (iv, 28; v, 25); 65 (xxx, 341). *Milowia nivea* Massee gen.nov. in 68 (2, iv, 841*, 1884); 14 (xiv, 6; xvi, 96); 8, 348*; 7, 336; 28 (iv, 169). On various plants.

GLOIOSPORAE—DIDYMOSPORAE

Cylindrocladium scoparium Morgan. 80, 66, 1923; *Rose Annual* 1933, 110; 77 (1933, 83; 1937, 189). On *Rosa* and *Prunus*.

GLOIOSPORAE—PHRAGMOSPORAE

Atractium flavoviride Sacc. 28 (xxi, 263, 1938). As *Fusarium melanochlorum* Casp.: Wollenweber, *Fus. autogr. del.* t. 1103 and 1123. On wood, stage of *Sphaerostilbe flavoviridis* Fuckel.

Candelospora ilicicola Hawley in 71 (xxxi, Part 13, 11*, 1912: *Candelospora* Rea & Hawley gen.nov. *ibid.*, p. 11); 28 (iv, 182). On dead leaves of *Ilex Aquifolium*, Clare Island. See 100 (xxix, 211).

Cylindrocarpon album (Sacc.) Wollenw. 79 (vi, 18). As *Fusarium*: 37 1909, 376; 70 (xxi, 417). 28 (x, 117, 1924) as *Ramularia heteronema* (B. & Br.) Wollenw.; see *Zeit. Parasitenkunde* 1, 153. On *Ulmus*, *Pyrus*, *Narcissus*, etc.

— **Ehrenbergii** Wollenw. As *Fusarium Brassicae* Thüm.: 14 (xvii, 14, 1888); 8, 480; 7, 349; see Wollenw. & Reinking, *Die Fusarien*, 319. On old *Brassica*.

— **heteronemum** (Berk. & Br.) Wollenw. in *Zeit. Parasitenkunde*, 1, 149, 1928. *Fusarium* B. & Br. in 19 (3, xv, 402*, No. 1051, 1865); 15, 559*; 14 (xvii, 15); 8, 483. On pears.

— **Mali** (Allesch.) Wollenw. 28 (x, 116, 1924); 78 (1938, 87); 34 (vii, 189, 1920) as *Fusarium*. On apples.

— **obtusisporum** (Cooke & Harkn.) Wollenw. *Fusisporium obtusum* Cooke in 14 (v, 58, 1876). *Fusarium obtusum* (Cooke) Sacc. in *Syll.* iv, 708; 14 (xvii, 15); 8, 482. On *Diatrype*, Scotland.

— **radicicola** Wollenw. 104 (xi, 261, 1933; xii, 222); 79 (xi, 37 and 57); 78 (1934, 306); 84 (iii, 187); 22 (Bull. 79, p. 109; Bull. 117, 85). On lettuce, strawberry, narcissus, and lily.

— **Willkommii** (Lindau) Wollenw. As *Fusarium*: 79 (vii, 18, 1930); 28 (xxi, 265). Conidial stage of *Nectria galligena*.

Fusarium anguioides Sherb. 34 (xvii, 289, 1930). In a salt marsh, Wales.—The British records of *Fusarium* are compiled under the names given in *Die Fusarien*, 1935.

— **aquaeductum** (Radlk. & Rabenh. p.p.) Lagerh. 28 (xvii, 112, 1932). In sewage.—Said to be a stage of *Nectria epispheeria* var. *coronata*.

- Fusarium argillaceum** (Fr.) Sacc. W. G. Smith 81, 30*, 1884 as *Fusisporium Solani* Mart., teste Wollenw. in *Zeit. Parasitenkunde*, III, 427; see also 31 (xvii, 483; 2, xxiii, 14; 2, v, 656) and 15, 622. On potatoes.
- **arthrosporioides** Sherb. 70 (xv, 218, 1917); 34 (xvii, 44). From potatoes and wheat.
- **avenaceum** (Fr.) Sacc. 22 (Bull. 21, 1917); 28 (x, 115; xxii, 113); Bennett 34 (xv, 213); 34 (xvi, 261; xx, 272; xxv, 96); 85 (xxxvii, 15); 35 (1936, 60); 87 (xii, 164); 22, Bull. 117. *F. diffusum* Carm. ex Cooke in 14 (xvi, 81); 8, 480. As *F. herbarum* (Corda) Fr.: 34 (xvi, 261; xxii, 479* and 630); 104 (vii, 302); 82 (xiv, 62; xxi, 44); 87 (xii, 164); 88 (xi, xii); 85 (1924); 22 (Bull. 79) as *F. herbarum* var. *avenaceum*; 34 (xxii, 484) as *F. herbarum* f. 2; 31 (3, lviii, 289) as *F. putrefaciens* Osterw. As *F. tubercularioides* (Corda) Sacc.: 14 (xvii, 14); 8, 479; 23 (xiv, 685); 22 (Bull. 79, p. 105); 79 (xi, 59); 84 (iii, 189). As *F. viticola* Thüm.; 14 (xvi, 11); 8, 479; 28 (x, 114). *Fusisporium incarcerans* Berk. in *Intell. Obs.* 1863, 11*; 15, 622. *Fusarium incarcerans* (Berk.) Sacc. in *Syll.* iv, 713; 8, 483. As *Selenosporium tubercularioides* Corda: 19 (5, vii, 130, No. 1904, 1881); 14 (x, 49). On cereals, tulips, etc.
- **avenaceum** form 1 Wollenw. 28 (x, 114, 1924) as *F. arcuatum* Berk. & Curt. and *F. anthophilum* Wollenw. As *F. anthophilum*: 104 (vii, 302); 82 (xiv, 64). In apples and carnations.
- **bulbigenum** Cooke & Massee in 14 (xvi, 49, 1887); Sacc. x, 725; 8, 482; 83 (Lxxv, 593); 37 (1913, 307); 23 (xx, 1091); 5A, p. 9 of Appendix; 34 (iv, 36); 56 (xliii, 51); 34 (xix, 475; xxii, 684); 79 (ii, 21 and 32; vi, 18; xi, 57); 112, 345; 33 (I, 333); 22, Bull. 117. Perhaps 19 (5, vii, 130*, No. 1907, 1881) as '*F. Equiseti* Desm.'; 14 (x, 49). As *F. Equisetorum* (Lib.) Desm.: 14 (xvii, 15); 8, 485. On *Narcissus*, etc.—Snyder & Hansen rename this *F. oxysporum* f. *Narcissi* in *Amer. J. Bot.* 1940.
- **bulbigenum** var. **Lycopersici** (Brushi) Wollenw. As *F. Lycopersici*: 56 (xix, 20*, 1895); 31 (3, xvii, 707*); 23 (v, 192; xi, 301; xiii, 101; xvii, 301); 5B, 328; 5, 490; 56 (xxvii, 819); 80, 84; 112, 347; 23 (xxxiii, 48; xxxviii, 60); 22, Bull. 79, as *F. bulbigenum*. In *Lycopersicum esculentum* in hot weather. *Verticillium* is the commoner cause of 'Sleepy Disease'.
- **bulbigenum** var. **niveum** (E. F. Smith) Wollenw. 80, 87, 1923 as *F. vasinfectum* var. *niveum*; 23 (Lii, 82). On melons.
- **caeruleum** (Lib.) Sacc. 14 (xvii, 14, 1888); 8, 481; 23 (xxi, 13; xxiii, 45; xxxiii, 38; xxxviii, 29; Lii, 25; Lxx, 20); 25 (xvi, 595; xvii, 601); 70 (xv, 193); 28 (vii, 195); 33 (xxxviii, 137); XLvi, 1034); 79 (iii, 23; v, 24; xi, 46); 112 348; 96 (I, 42); 65 (xxx, 343); 71 (xl, 55); 85 (xxxv, 18; xxxvii, 15; xli, 16). In Dry Rot of potato tubers.
- **Carpini** Schulz. & Sacc. 62 (xii, 83, 1924). On *Carpinus*. A doubtful record.
- **ciliatum** Link sensu Wollenw. *Fusisporium filisporum* Cooke in 14 (viii, 8, 1879).—*Fusarium filisporum* (Cooke) Sacc. in *Syll.* iv, 708; 8, 482. On *Orthotrichum*, Eastbourne.
- **conglutinans** Wollenw. var. **Callistephi** Beach. 31 (xcv, 215, 1934); probably this fungus as *F.sp.* 56 (xxxv, p. cxxv); 82 (x, 66); 22 (Bull. 79). In *Callistephus*.
- **culmorum** (W. G. Smith) Sacc. in *Syll.* xi, 651; 23 (xxiii, 43, 1920; xxxviii, 14; Lii, 13); 89, 232*; 22 (Bull. 79); 34 (xv, 213; xvi, 261; xix, 482; xx, 272; xxii, 630); 28 (x, 116; xvi, 253; xviii, 249; xix, 147; xxi, 114); 112, 349; 85 (xxxvii, 15); 87 (xii, 164); 104 (vii, 302; xi, 261; xiv, 218); 82 (xiv, 43 and 64; xx, 46; xxi, 44); 31 (xcviii, 267); 99 (xxvii, 86); 84 (vi, 87 and 93); 71 (xlb, 55); 33 (xli, 520; xliii, 379; L, 333). *Fusisporium* W. G. Smith in 81, 208*, 1884; 102 (x, 471; xii, 48) as *Fusarium rubiginosum* Appel & Wollenw. On cereals, etc.
- **culmorum** var. **cereale** (Cooke) Wollenw. *Fusisporium cereale* Cooke in 14 (vi, 139, 1878, from Florida); 27 (xxii, 200*, 1884); 60 (xx, 92). On wheat, Warwicks.

- Fusarium Dianthi** Prill. & Delacr. 34 (xxii, 630, 1935); 82 (xxi, 45); 104 (xiv, 219); 84 (vi, 93). In *Dianthus*.
- **Equiseti** (Corda) Sacc. 34 (xxii, 487, 1935); 23 (xliii, 124); 34 (xxii, 490*) as forma 1. *F. Cordae* Masee in 8, 481, 1893; 7, 349. On cereals, etc.
- **flociferum** Corda. 99 (xxvi, 86); *F. vinosum* Masee in 8, 479, 1893. On mushrooms, etc.
- **graminearum** Schwabe. 68 (1883, 321*); 81, 209*; 22 (Bull. 79); 23 (xxxvi, 6); 34 (xvii, 43; xviii, 158; xx, 272 and 377). *Fusisporium insidiosum* Berk. in 31 (1860, 480); 18, 355; 15, 622. *Fusarium insidiosum* (Berk.) Sacc. in *Syll.* iv, 707; 14 (xvii, 14); 8, 483; 89, 241*. On cereals and grasses, a stage of *Gibberella Saubinetii* (G. Zeae).
- **heterosporum** Nees ex Fr. 31 (1860, 958); 19 (3, vii, 449, No. 955, 1861); 15, 559; 14 (xvii, 14); 8, 481; 5B, 331; 5, 493; 89, 237*; 7, 349; Vize Exs. 351. *Fusisporium Lolii* W. G. Smith in 81, 213*, 1884; *Fusarium Lolii* (W. G. Smith) Sacc. in *Syll.* xi, 652. On grasses and *Claviceps*.
- [— **inaequale** Auersw. 14 (xvii, 14); 8, 480. Identity unknown.]
- [— **Kuehnii** (Fuckel) Sacc. 8, 484; 14 (iv, 120, 1876) as *Fusisporium*. On mosses and lichens, Norfolk. A state of *Corticium centrifugum*. See *Oester. Bot. Zeit.* liv, 427.]
- **lateritium** Nees ex Fr. 19 (i, iv, 438, No. 249, 1841); 18, 341; 15, 558; 13, 266; 8, 478; 14 (xvii, 14); 7, 349; Berk. Exs. 262. As var. *fructigenum*: 85 (xxix, 16; xxxv, 21); 22 (Bull. 79); 71 (xlii, 54); 79 (xi, 50); 34 (xxv, 96). As *F. fructigenum* Fr.: 28 (x, 98; xii, 170; xv, 96; xix, 147); 34 (xii, 17); 22 (Bull. 70); 67 (civ, 427 and 444; cvb, 375); 33 (xlvi, 1034; xlvii, 548; xlviii, 188 and 363; l, 333 and 700); 79 (x, 32; xii, 25); 112, 351. *F. Blackmani* Brown & Horne in 33 (xxxviii, 383; xxix, 373; xl, 203 and 229; xlii, 285; xliii, 245). As *F. pyrochroum* Sacc.: 14 (xvii, 14); 8, 279. On apples, etc., stage of *Gibberella baccata* (Wallr.) Sacc.
- **lateritium** var. **Mori** Desm. 23 (lxx, 56). As *F. lateritium*: 31 (3, lx, 95, 1916); 77 (1928, 83). On *Morus*.
- **Lini** Bolley. 28 (ii, 15, 1903); 89, 251*; 23 (xix, 33); 25 (xx, 339; xxi, 180; xxii, 109); 112, 351. On *Linum*.
- **merismoides** Corda. 34 (xxii, 504*) as var. *majus*. As *Fusisporium Betae* Desm.: 19 (i, vi, 438, No. 246, 1841); 15, 620; 13, 287. As *Pionnotes Betae*: 37 (1906, 49*); 71 (xxvii, 150). As *Fusarium Betae*: 8, 484. As *Pionnotes Biasoletti* Corda: 14 (xvii, 80); 8, 486. *Fusisporium foeni* B. & Br. in 19 (2, vii, 179, No. 550, 1851); 15, 621. As *Fusarium foeni*: 14 (xvii, 14); 8, 480. As *Fusisporium Georginae* Klotz.: 19, No. 247, 1841; 15, 620. *Fusisporium roseolum* Stephens ex B. & Br. in 19 (2, vii, 178, No. 549); 15, 621; 31 (2, xxii, 40*); Vize Exs. 253. As *Fusarium roseolum*: 14 (xvii, 15); 8, 483. *Fusisporium udum* Berk. in 19 (i, vi, 438*, No. 245, 1841); 15, 620. As *Pionnotes uda*: 14 (xvii, 15); 8, 486. As *Fusarium udum*: 28 (xvii, 14); 71 (xlii, 54). On decaying plants.
- **moniliforme** Sheldon. 79 (vi, 18, 1930). On *Narcissus*.
- **moniliforme** var. **subglutinans** Wollenw. & Reinking. 34 (xix, 485, 1932). On *Narcissus*.
- **nivale** (Fr.) Ces. 86 (ii, 116, 1931; iii, 79); 22 Bull. 79; 79 (ix, 22 and 42; xi, 59); 34 (xx, 272); 85 (xxxv, 20); 87 (xii, 164). As *F. minimum* Fuckel: 14 (xvii, 14, 1888); 8, 481. On grasses; stage of *Calonectria graminicola*.
- **orthoceras** Appel & Wollenw. 104 (xii, 235, 1934); 34 (xvii, 288) as *F. oxysporum* var. *resupinatum* Sherb. In strawberry roots and soil.
- **oxysporum** Schlecht. ex Fr. 34 (ix, 117, 1922); 28 (xvii, 229); 22 (Bull. 79); 99 (xxvii, 86). *F. Myosotidis* Cooke in 14 (xvi, 49, 1887); 8, 480; Vize Exs. 576. Causing wilt of potatoes, and in cultivated mushrooms.
- **oxysporum** var. **aurantiacum** (Link) Wollenw. As *Fusisporium aurantiacum* Link: 20, 351, 1836; 15, 622; 13, 287. As *Fusarium aurantiacum*: 14 (xvii, 15); 8, 485. As *Fusoma parasiticum* Tub.: 85 (xi, 87*); 23 (xxxix, 355); Hiley, *Diseases of Larch*. As *Fusarium sclerotoides* Sherb.: 34 (ix, 117); 78 (1929, 150). On herbs, etc.

- Fusarium oxysporum** var. **Gladioli** Massey. 22, Bull. 117, 1939. On *Gladiolus*.
 — **Pelargonii** Cooke [non Crouan?] in 31 (3, xx, 92, 1896); 56 (xxvii, 39); 89, 40. On *Pelargonium*. Not cited in *Die Fusarien*.
 — **redolens** Wollenw. 99 (xxvii, 94, 1937). On cultivated mushrooms.
 — **reticulatum** Mont. 31 (3, xx, 248, 1896); 56 (xxvii, 822); 89, 100. In melons and cucumbers.
 [— **rhabdophorum** B. & Br. in 19 (4, xvii, 142, No. 1612, 1876); 8, 484. This is said to be a *Cylindrosporium*.]
 — **roseum** Link ex Fr. 20, 355, 1836; 15, 559; 28 (1, 184); 68 (1901, 615); 8, 480; Cooke Exs. 344 and II, No. 339, and other early records, all doubtful.
 [— **salicinum** Corda. 19, No. 1908, 1881; 8, 484. This is *Libertella salicina* (Corda) Wollenw.]
 — **sambucinum** Fuckel. 34 (xxi, 493*); 99 (xxvii, 94). *Fusisporium Hordei* W. G. Smith in 81, 212*, 1884; 89, 234* as *Fusarium Hordei*. On various hosts; stage of *Gibberella pulicaris*.
 — **sambucinum** f. 1 Wollenw. 34 (xxii, 497*, 1935). From grasses.
 — **sambucinum** f. 6 Wollenw. 99 (xxvii, 94, 1937). On cultivated mushrooms.
 — **sarcocroum** (Desm.) Sacc. 14 (xvii, 14, 1888); 8, 478. On bark.
 — **Scirpi** Lamb. & Fautr. Bennett 34 (xix, 21*, 1932) described var. *pallens* and var. *nigrans* from *Triticum* and *Hordeum*. Both are placed as *F. Scirpi* in *Die Fusarien*.
 — **Scirpi** var. **acuminatum** (Ellis & Everh.) Wollenw. 82 (xxi, 44). As *F. acuminatum* Ell. & Ev.: 104 (vii, 302); 82 (xiv, 64); 33 (xxxix, 373); 34 (ix, 117, 1922) as *F. ferruginosum* Sherb. In *Dianthus*, etc.
 — **Scirpi** var. **filiferum** (Preuss) Wollenw. *Fusisporium mucophyllum* W. G. Smith in 31 (2, xxii, 245*, 1884). *Fusarium mucophyllum* (W. G. Smith) Cooke in 14 (xvii, 15); 8, 483; 7, 349. On agarics.
 — **Solani** (Martius) Sacc. 79 (vi, 18); many more or less meaningless older records, e.g. 56 (xxvii, p. liv); 89, 91; 36 (xxxix, 120); 23 (xvi, 858); 102 (x, 471; xii, 47); 8, 481; 56 (xxix, 141); 31 (3, xxxv, 257); erroneously considered by Massee 5, 180* and 565 to be the conidial stage of *Nectria Solani*. As *F. commutatum* Sacc.: 68 (1901, 615*); 28 (1, 185). As *F. viride* (Lechm.) Wollenw.: 61 (cxxxviii, 67); 18, 356 as *Fusisporium Solani-tuberosi* Desm. On potatoes, etc.—Saccardo was the first to transfer Martius's name to *Fusarium*; it is immaterial that he was studying another fungus.
 — **Solani** var. **Martii** (Appel & Wollenw.) Wollenw. 31 (3, xvii, 243); 79 (xi, 46). *F. epimyces* Cooke ex Massee in 8, 482; nom. nud. 14 (xvii, 15). As *F. Martii* Appel & Wollenw.: 28 (x, 116); 79 (x, 38; xi, 49); 99 (xxvii, 86). On mushrooms, etc.
 — **Solani** var. **Martii** f. 1 Wollenw. 28 (x, 116, 1924) as *F. Martii* var. *viride* Sherb. In apples.
 — **Solani** var. **Martii** f. 2 Snyder. 78 (1934, 187). As *F. Martii* var. *Pisi* F. R. Jones: 78 (1930, 135; 1931, 129; 1932, 110). On *Pisum*.
 — **Solani** var. **Martii** f. 3 Snyder. As *F. Martii* var. *Phaseoli* Burkh.: 78 (1929, 151; 1930, 128; 1931, 124; 1933, 102); 79 (x, 39); 22 (Bull. 79) as *F. Solani* var. *Martii*. On *Phaseolus*.
 — **Sphaeriae** Fuckel. 27 (LXX, 37*, 1932). On *Leptosphaeria doliolum* on *Urtica*, etc.; stage of *Lasionectria Leptosphaeriae*.
 — **sporotrichioides** Sherb. 104 (vii, 305, 1929); 82 (xiv, 64). On *Dianthus*.
 — **translucens** Berk. & Br. in 19 (4, xvii, 141, No. 1610, 1876); Sacc. iv, 721; 14 (v, 58); 40 (iii, 272); 13, 267; 8, 485. On 'deal', Scotland. Doubtful; considered possibly a *Hymenula* in *Die Fusarien*.
 — **trichothecioides** Wollenw. 34 (xxii, 500*, 1935). On *Triticum* and *Hordeum*.
 — **trichinctum** (Corda) Sacc. 34 (xxii, 502*, 1935). Saprophytic on several plants.
 — **vasinfectum** Atk. Reported 23 (xxiii, 48) and 63 (Lxxvii, 313). On beans and peas.
 [— spp. There are numerous British records of '*Fusarium* sp.' on various hosts. Cards giving these records, and more detailed reports of the hosts of the species

mentioned above, are in the custody of Mr W. C. Moore of the Ministry of Agriculture Laboratory, Harpenden, who has assisted us greatly in compiling records of *Fusarium*.]

Mastigosporium album Riess. 40 (ix, 41, 1887); 26A (Bull. H 1, 1922); 87 (I, 106); 22 (Bull. 79); 28 (xxii, 168*). On *Alopecurus*.

— **rubricosum** (Dearn. & Barth.) R. Sprague in 100 (xxx, 43); syn. *M. calvum* (Ellis & Davis) R. Sprague in 110 (Lvi, 298). As *M. album* var. *muticum* Sacc.: 37 (1918, 233); 28 (vi, 373; xxii, 168*); 26A (Bull. H 1); 85 (xxvi, 165). On *Dactylis*.

Microcera coccophila Desm. 15, 556*, 1871; Cooke, *Vegetable Wasps* p. 322*; 14 (xvii, 15); 8, 486; 28 (vii, 115*; xvii, 177; xxi, 262); 35 (1932, 134); Cooke Exs. 350 and II, No. 534; 19, No. 1311, 1871 as *M. coccophora* Desm. *Atractium flammeum* Berk. & Rav. apud B. & Br. in 19 (2, xxi, 461, No. 757, 1854); Sacc. iv, 599; 18, 340; 15, 555*; 8, 452*. On *Chionaspis*; stage of *Sphaerostilbe flammea* Tul.

INCERTAE—AMEROSPORAE

(INCERTAE GLOIOSPORAE V. XEROSPORAE)

Calcarisporium arbuscula Preuss. 28 (iii, 121*, 1909; xvi, 232). On fungi, Hants.

Cylindrocephalum stellatum (Harz) Sacc. var. **claviforme** Grove in 27 (Lxx, 36, 1932). On horse dung, Liverpool.

Lasioderma flavovirens Dur. & Mont. 48 (xvii, 27, 1908). On leaves, Ireland.

XEROSPORAE—AMEROSPORAE

Acremoniella atra (Corda?) Sacc. 35 (1909, 419; 1911, 166); E. W. Mason, *Annotated Acc.* List II, Fasc. 2, 29*. *A. pallida* Cooke & Massee in 14 (xvi, 79, 1888); 8, 379*; 27 (xxxv, 8); 27 (xxii, 197*) as *Botrytis coccotricha* Sacc.; 8, 314. As *Eidamia acremonioides* (Harz) Lindau: 33 (xxxvii, 394; xxxviii, 354). *Langloisula macrospora* A. L. Smith in 68 (1901, 617*); 28 (I, 185*; vi, 117*). On seeds, etc.

— **fusca** (Kunze & Schm. ex Fr.) Sacc. 14 (xvi, 99); 8, 379; 71 (xxviii, 149). As *Acremonium*: 39 (I, 121, 1823); 51, 468; 20, 347; 15, 615; 13, 286. On wood.

— **verrucosa** Togn. E. W. Mason, op. cit. p. 34, 1933; *Eidamia tuberculata* Horne & Jones in 33 (xxxviii, 354, 1924). In wood, etc.

Acremonium album Preuss. 35 (1932, 126; 1936, 237); 28 (xvi, 242; xvii, 3). On Myxomycetes.

— **alternatum** Link ex Fr. 120, 550, 1821; 20, 347; 15, 615*; 8, 305*; 28 (I, 184); 68 (1901, 615); 7, 331. On seedlings and leaves.

— **fimicola** Massee & Salm. in 33 (xvi, 79*, 1902); Sacc. xviii, 523. On dung.

— **spicatum** Bon. 35 (1910, 405; 1911, 166); 28 (iii, 286). In polluted water, Yorks.

— **tenuipes** Petch in 28 (xxi, 66, 1937). On spiders, Norfolk.

— **verticillatum** Link ex Fr. 120, 550, 1821; 39, t. 124; 20, 347; 15, 615*; 13, 285; 14 (xvi, 60); 8, 305; 7, 331; 71 (xxviii, 148). On wood.

Acrotheca acuta Grove in 27 (LIV, 222*, 1916); Sacc. xxv, 766. On old *Urtica*, Hereford.

— **canescens** Grove in 27 (xlv, 69*, 1907); Sacc. xxv, 767; 27 (I, 18). On roots; conidial stage of *Dasyscypha canescens*.

— **Solani** Sacc. 8, 372, 1893. On old potato leaves.

Aegerita candida Pers. ex Fr. 39, t. 268, 1823; 20, 324; 19 (3, iii, 362*, No. 823, 1859); 15, 561*; 19, No. 1714; 13, 268; 8, 469*; 7, 348; 71 (xxviii, 150). On wood; stage of *Peniophora candida* Lyman.

- Aegerita insectorum** Petch in **28** (xxi, 63, 1937). On larva, Cambs.
- **virens** Carm. ex Cooke in **14** (xvi, 81, 1888); Sacc. x, 711; **8**, 469. On birch bark, Scotland.
- **viridis** Bayliss Elliott in **28** (vi, 56*, 1918); Sacc. xxv, 952. On wood, Warwicks. [= *Trichoderma viride*?]
- Akanthomyces aculeata** Lib. **35** (1932, 48 and 133); **28** (xvii, 176; xviii, 72). On moths. See *Isaria Sphingum*.
- Arthrinium caricicola** Kunze ex Fr. **8**, 373*, 1893. On old *Carex*.
- **sporophlaeum** Kunze ex Fr. **18**, 346, 1860; **15**, 585*; **8**, 373; Berk. Exs. 311. On *Carex*.
- Aspergillus candidus** Link ex Fr. **20**, 339, 1836; **15**, 588; **8**, 296; **102** (x, 462); **33** (xvi, 83); **7**, 330. A common saprophyte.—See **66** (ccxxv), **116**, and G. Smith, *Industrial Mycology*, for references to *Aspergillus*. The *Aspergilli* by Thom & Church has been followed for names.
- **Chevalieri** (Mangin) Thom & Church. **33** (L, 702). British?
- **clavatus** Desm. **33** (xvi, 82*, 1902); **27** (Lx, 174); **116**, 97. On paper, etc.
- **conicus** Blochwitz apud E. Dale in **102** (xii, 38*, 1914); **102** (xxvii, 206). In soil.
- **depauperatus** Petch in **28** (xvi, 244*, 1931); **28** (xvii, 174). On insects, Norfolk and Ceylon.
- **'dubius** Corda'. **19** (2, vii, 100, No. 520, 1851); **15**, 588. On dung of rabbit and mouse. '*Sterigmatocystis dubia* (B. & Br.) Sacc'. in *Syll.* iv, 72; **8**, 298; **33** (xvi, 81). Thom and Church did not know the species.
- **flavus** Link ex Fr. **120**, 555, 1821; **14** (xvi, 59); **8**, 297; **7**, 330; **116**, 83; **66** (ccxxv, 127); **37** (1907, 242) as '*A. flavus* de Bary'. On organic substances.
- **fumigatus** Fres. **35** (1915, 48); **27** (Lx, 136); **75** (xxi, 123); **34** (xvii, 291); **70** (xix, 552); **116**, 83. In soil, etc.
- **fumigatoides** Bain. & Sart. **34** (xvii, 296, 1930). In salt-marsh soil.
- **glaucus** Link ex Fr. **51**, 467, 1824; **58**, 211; **20**, 340; **65** (v, 193); **15**, 588*; **13**, 274; **8**, 295*; **7**, 330*; **68** (1901, 615); **28** (I, 184); **103** (v, 222); **28** (xvii, 221); **70** (xix, 554*); Berk. Exs. 208. As *Mucor*: **38** (Ed. I, II, 784, 1776); **42**, t. 378; **55**, 721. **92**, 33 as *Monilia*; **102** (v, 419*; vii, 215) as *A. herbariorum* Wigg. A common saprophyte.
- **griseus** Link ex Fr. **19** (5, vii, 130, No. 1912, 1881); **40** (x, 50); **8**, 296; **35** (1915, 48). An uncertain species, recorded also as '*forma fenestrale*' **14** (xvi, 59); as *Sporotrichum fenestrale* Ditm. **18**, 352; **15**, 611; and as *Byssocladium fenestrale* Link, **120**, 551, 1821.
- **luteoniger** (Lutz) Thom & Church. **70** (xix, 315*, 1929). In milk, Ireland.
- **mollis** Berk. in **20**, 340, 1836; Sacc. iv, 67; **15**, 589; **8**, 296. On leaves, Norths. Still a doubtful species.
- **nidulans** (Eidam) Wint. **74** (vii, 145*, 1912); **28** (iv, 181); **75** (xxii, 123); **116**, 98; **66** (ccxxv). In beehives, etc.
- **niger** van Tiegh. **28** (ii, 33, 1903; viii, 115); **57** (v, 36); **23** (xix, 85); **33** (xxxii, 531; xxxvii, 343); **22** (Bull. 38, p. 56); **75** (xxii, 123); **24** (xvi, 404); **32** (xxxiv, 211; xxxvi, 327); **90** (xiv, xv); **116**, 84 and 98; **73** (2, vii, 373) as *Sterigmatocystis*; *Rhopalocystis* Grove gen. nov. in **74** (vi, 40*, 1911); *A. 'nigricans* Cooke' ex Sacc. in *Syll.* iv, 70; Cooke **14** (vi, 127, 1878) as *A. 'nigricans* Auct.'; **7**, 330; **28** (vi, 59*) as *Sterigmatocystis phaeocephala* Sacc.; *Rhopalocystis phaeocephala* (Sacc.) Grove in **74** (vi, 40); **10**, 85 as *Ustilago ficuum* Reichardt. A common saprophyte.
- **ochraceus** Wilhelm. **75** (xxii, 123, 1924); **115**, 95. In air, etc.
- **Oryzae** (Ahlb.) Cohn. Listed **115**, 95, 1937.
- **repens** (Corda) Sacc. **102** (vii, 215*, 1909; x, 262); **33** (xxxvi, 262; L, 702); **66** (ccxxv, 27). In soil, etc.
- **roseus** Link ex Fr. **20**, 340, 1836; **15**, 588; **8**, 297. On paper, etc. Probably not an *Aspergillus*.
- **Schiemannii** Thom. Listed **115**, 95, 1937. It is a variant of *A. niger*.

- Aspergillus spiralis** Grove in 27 (xxiii, 164*, 1885); Sacc. iv, 69; 8, 297. On a cork. Possibly *A. glaucus*.
- **sulphureus** (Fres.) Thom & Church. 27 (liv, 220, 1916) as *Sterigmatocystis*; 28 (v, 430). On fabric.
- **Sydowi** (Bain. & Sart.) Thom & Church. 70 (xix, 553, 1930); 66 (ccxxv). In butter, etc.
- **Tamaritii** Kita. 66 (ccxxv), from Cambridge.
- **terreus** Thom. 70 (xix, 20, 1929 and p. 554*); 66 (ccxxv). In butter, etc.
- **versicolor** (Vuill.) Tirab. 66 (ccxxv); 102 (xxii, 37) as *A. globosus* Jensen. In soil, etc.
- **virens** Link ex Fr. 51, 467, 1824; 20, 340; 15, 589; 13, 274; 8, 296; 7, 330. On fungi, etc. An unknown species.
- Beauveria Bassiana** (Bals.) Vuill. 28 (xvi, 59; xvii, 174; xx, 4); 35 (1932, 167); 116, 144 as *Botrytis*; *Annotated Acc. Fungi Recd. I.B.M.* List II, Fasc. I, p. 26, 1928 as *Beauveria globulifera* (Speg.) Picard. On insects and spiders.
- **densa** (Link ex Sacc.) Picard. E. W. Mason, *Fungi Recd. I.B.M.*, List I, p. 7, 1925; 28 (xvi, 60; xvii, 175; xviii, 4); 35 (1932, 167); 76 (iii, 63) as *Isaria*. On insects and spiders. The transfer to *Beauveria* was apparently first made by Picard in *Ann. Serv. Épiph.* I, 160, 1913.
- Botryosporium diffusum** (Alb. & Schw. ex Fr.) Corda. 18, 354; 15, 617; 13, 286; 48 (v, 234); 14 (xvi, 59); 8, 291*; 33 (xiv, 31*, on *Tradescantia*); 7, 329; Cooke Exs. I, No. 353. As *Botrytis*: *Mem. Wern. Nat. Hist. Soc.* I, 72*, 1822; 51, 468; 39, t. 126, 1825. [20, 341, 1836 as *Stachylidium* was *Botryosporium pulchrum*]. On dead plants.—See E. W. Mason, *Annotated Acc. List II*, Fasc. I, p. 27, 1928, on *Botryosporium*. He points out that *B. diffusum* is uncertain.
- **foecundissimum** (Sacc. & March.) Massee & Salm. in 33 (xvi, 81*, 1902). On dung of giraffe, 'Kew'. As *Cladorrhinum*: 82 (xii, 43). Reported with doubt from cucumber roots.
- **longibrachiatum** (Oudem.) Maire. E. W. Mason (op. cit.). On dying *Dracaena*, England.
- **pulchrum** Corda. 68A (v, 117, 1857); 18, 354; 15, 617*, 46 (iii, 136); 8, 292; 28 (iii, 35*); 7, 329. On old herbs. See *B. diffusum*.
- **pyramidale** (Bon.) Cost. 35 (1936, 275, on *Mercurialis*). As *Botrytis*: 28 (v, 414*, 1917); 34 (xvii, 288). On wood and in soil.—See E. W. Mason, op. cit.
- Botryotrichum piluliferum** Sacc. & March. 28 (vi, 374, 1920). On sacking, Baslow.
- Botrytis aclada** Fres. 8, 319, 1893. On decaying scapes of onion.—This and several other determinations of *Botrytis* are doubtful.
- **Allii** Munn. 22 (Misc. Publ. 52, p. 55, 1926; 70, p. 38; Bull. 79, p. 62); 33 (xliv, 469 and 557); 56 (liii, 50); 65 (xxx, 257 and 343); 71 (xlb, 54). On *Allium*. Referred to *B. cinerea* until about 1926.
- **angularis** A. L. Smith in 27 (xxxvi, 181*, 1898); Sacc. xvi, 1033. On moss and soil, Newport, Mon.
- **anthophila** Bondarzew. 28 (xviii, 239*, 1933); 26A, Ser. H., No. 4, 1925, as *B. antherarum-Trifolii* Schlecht. In anthers of *Trifolium pratense* throughout Britain.
- **argillacea** Cooke in 14 (iii, 183, 1875); Sacc. iv, 125; 8, 315; 28 (iii, 284; vi, 78); Cooke Exs. II, No. 353; Vize Exs. 79. On wood.
- **brevior** (Berk. & Br.) Sacc. in *Syll.* iv, 123; 8, 315. *Coccotrichum brevius* B. & Br. in 19 (5, vii, 131*, No. 1918, 1881); 14 (xx, 50); 46 (iii, 136). On bark.
- **cana** Kunze & Schm. ex Fr. 20, 342, 1836; 8, 317; 40 (v, 325); 7, 332. As *Polyactis*: 15, 600; 13, 279; 56 (xi, p. liii); 23 (iii, 283); 27 (xvii, 335); Cooke Exs. 355; Vize Exs. 244. On leaves.
- **capitata** (Berk. & Br.) Sacc. in *Syll.* iv, 132; 8, 318; *Polyactis* B. & Br. in 19 (5, vii, 131, No. 1919, 1881); 14 (x, 51; xvi, 62). On *Cheiranthus*.
- **cinerea** Pers. ex Fr. The first British record noted as *Botrytis* is Johnston 58, 212, 1831, 'parasitical on *Sclerotium durum*', then Berk. 20, 342, 1836. *S. durum* Pers. ex Fr. was recorded by Hooker 92, 10, 1821; Greville 39, t. 1,

1823 and **51**, 462; Baxter Exs. 98; Berk. Exs. 74, etc. *Sphaeria solida* Sowerby in **42**, t. 314, 1801, may have been *Sclerotium durum*. For a time *B. cinerea* arising from sclerotia (*S. durum*) was called var. *sclerotiphila* Sacc. e.g. **8**, 318.—The more important British records of *B. cinerea* (some as *Polyactis cinerea* (Pers., Berk.) are amongst the following: **5**, 459; **15**, 601; **22**, numerous records; **23** (III, x, xi, xv, xxiii, xxxiii, xliii); **25** (xvi, 579; xvii, 600); **28** (viii, 115; xiv, 118; xvi, 309; xvii, 331; xx, 299); **32** (xvi, 109; xxiii, 78); **33** (II, xviii, xxii, xxix–xxxii, xxxvi–xxxviii, xli, xliv, xlvi, xlviii, l); **34** (x, 335; xvii, 288; xxv, 92); **37** (1916–18); **64** (xlvi, 20); **65** (xxx, 59); **66** (cxviii, 7; ccxv, 83; ccxxv, 99); **67** (lxxiii, 118; cii, 427 and 444; cv, 375; cxi, 210); **70** (xix, 562); numerous records in **77**; **78**; **79**; **85**; **89**; **93**; **104** (vii, 237); **102** (viii, 167); Cooke Exs. II, No. 342. As *B. Douglasii* Tubeuf on conifers: **28** (I, 25; vii, 85); **64** (xv, 320; xxxiv, 223; xxxv, 77); **89**, 226. Common on numerous hosts. A. Lorrain Smith **27** (xli, 19, 1908), reported apothecia in Britain. See also **100** (xxxi, 485).

- Botrytis citrina** Berk. in **19** (I, 1, 262*, No. 127, 1838); **15**, 592*; Sacc. IV, 122; **8**, 315. On fallen cherry branches.
- **convoluta** Whetzel & Drayton. Reported **100** (xxiv, 476, 1932) on rhizomatous *Iris* from England.
- **corolligena** Cooke & Massee in **14** (xvi, 10, 1887); Sacc. x, 536; **8**, 314. On *Calceolaria* flowers, Kew.
- **Croci** Cooke & Massee in **14** (xvi, 10, 1887); Sacc. x, 536; **56** (xxvii, 394); **89**, 71; see **22** (Bull. 117, p. 149). On *Crocus*.
- [— **curta** Berk. in **19** (I, 1, 262, No. 128, 1838) is *Plasmopara pygmaea*.]
- **dichotoma** Corda. **68A** (1877, 191); **48** (1900, 98); **28** (I, 151). On decaying tulip stem near Dublin.
- **elliptica** (Berk.) Cooke in **56** (xxvi, p. cxxix); **22**, Bull. 117, with references; see also *Lily Year Book* 1933, 194; **79** (vi, vii, xi); **71** (xlii, 53). *Ovularia* Berk. in **31** (2, xvi, 340*, 1881); **19** (5, ix, 183, No. 1980, 1882); **14** (x, 51; xvi, 62); **33** (II, 319, 1888) as *Botrytis (Polyactis)* sp. On *Lilium*.
- **fascicularis** (Corda) Sacc. **8**, 318; **7**, 333. As *Polyactis*: **73** (1870, t. 6); **15**, 601; **13**, 279; Vize Exs. 572. As *Penicillium fasciculatum* Sommerf.: **19** (I, 262, No. 129, 1838); Berk. Exs. 310. This is doubtless *B. cinerea*.
- **galanthina** (Berk. & Br.) Sacc. in *Syll.* IV, 136; **22**, Bull. 117, with references; **8**, 320; **56** (LIII, 49); *Polyactis* B. & Br. in **19** (4, xi, 346, No. 1385, 1873). On *Galanthis nivalis*.
- ?**Gladioli** Kleb. **22** (Bull. 117, 1939). On *Gladiolus*.
- **gonatobotryoides** Cooke & Massee in **14** (xvi, 79, 1888); Sacc. x, 536; **8**, 314. On *Hypericum calycinum*, Kew.
- **grisella** Sacc. **28** (III, 224, 1910) as *B. griseola* Sacc. On wood, Kew.
- **Hyacinthi** Westerd. & van Beyma. **22** (Bull. 117, 14, 1939). On *Hyacinthus*.
- **isabellina** Preuss. **27** (I, 13, 1912). On pine bark, Lincs.
- **narcissicola** Kleb. **22** (Bull. 117, 67) with references; **79** (IX–XI); **56** (LIII, 48); **65** (xxx, 347). On *Narcissus*.
- **Paeoniae** Oudem. **31** (3, xxiv, 124*, 1898); **5B**, 157; **89**, 19*; **28** (vi, 371); **112**, 141; **93**, 194; **35** (1923, 250); **79** (vii, 20 and 35; xi, 56). On *Paeonia*.
- **pilulifera** Sacc. **33** (xvi, 81*, 1902). On fowl's dung, Kew.
- **polyblastis** Dowson in **28** (xiii, 102*, 1928); **22** (Bull. 117, 69) with references: **79** (v–xiii). On *Narcissus*, stage of *Sclerotinia polyblastis* Gregory in **28** (xxii, 202).
- **trabea** (Berk. & Br.) Sacc. in *Syll.* IV, 117; **8**, 314; *Stachylidium* B. & Br. in **19** (5, vii, 131*, No. 1920, 1881). On wood, King's Cliffe.
- **tricephala** (Phill.) Sacc. in *Syll.* IV, 135; **8**, 319; *Acmospodium* Phill. in **31** (2, xxi, 317*, 1884). On *Cryptomeria japonica*.—Barnes, Rep. Proc. Imperial Bot. Conf. London, 1924, p. 346, 1925, reports an *Acmospodium* stage of a *Lachnea*.
- **truncata** (Cooke) Sacc. **28** (vi, 370, 1920). On wood, Woolwich.
- **Tulipae** (Lib.) Lind. **22** (Bull. 117, 20) with references, some as *B. parasitica* Cav. and *B. vulgaris* Fr.; **79** (III–XII); **85** (xxix); **56** (LIII, 48); **65** (xxx, 59 and

348); **33** (xxxvi, 262 and 294) as *B. parasitica* from onion; **77** (1924, 111). On *Tulipa* (and onion?).

Botrytis vera Fr. **20**, 342, 1836; **68** (1901, 615); **28** (1, 184); **8**, 317. *Polyactis vera* (Fr.) Berk. in **18**, 350; **15**, 600; **111**, t. 132, 1789 as *Mucor Botrytis*. On *Polyporus*, etc.; probably *B. cinerea*.

— **violacea** Grove in **27** (L, 13*, 1912); Sacc. xxv, 695. On rotten wood and humus, Warwicks.

— **virella** Fr. **14** (xvi, 61, 1887); **8**, 315; **7**, 332. On old wood.

— **vulgaris** Fr. **20**, 342, 1836; **31** (1886, 173); **8**, 316, with four 'varieties'. As *Polyactis*: **120**, 554, 1821; **15**, 600*, and other early records. Generally considered to be *B. cinerea*.

Briarea elegans Corda. **8**, 303*; **7**, 331. *Aspergillus penicillatus* Grev. in **39**, t. 32, 1823; **51**, 467. *Monilia penicillata* Fr. in *Syst.* iii, 410 ('penicillata' is thus the valid specific epithet); **20**, 344. As *M. 'fasciculata* Corda': **18**, 351; **15**, 106*; **13**, 281. On old grass.

Campotom curvatum Link ex Corda. **19** (2, vii, 100, No. 518, 1851); **15**, 586*; **73** (1877, t. 27); **13**, 274; **8**, 372*; E. W. Mason, *Annotated Acc.* List II, Fasc. 2; Berk. Exs. 310. On *Scirpus*, etc. Fries compiled this species under *Arthrimum*.

Catenularia simplex Grove gen.nov. in Sacc., *Syll.* iv, 303, Apr. 1886 and **27** (xxiv, 201); **8**, 380. On wood, Staffs. See E. W. Mason, *Annotated Acc.*, List II, Fasc. 3.

Chaetopsis grisea (Ehrenb. ex Fr.) Sacc. *C. Wauchii* Grev. gen.nov. in **39**, t. 236, 1823; **18**, 353; **15**, 614*; **13**, 285; **8**, 385*; **20**, 337 as *Dematium griseum* Pers. On wood.

Chromosporium aureum (Corda) Sacc. **7A**, 296, 1904; **7**, 327; **37** (1909, 376). On old rug, etc.

— **lateritium** (Berk. & Br.) Sacc. in *Syll.* iv, 7; **8**, 275*; *Gymnosporium* B. & Br. in **19** (5, vii, 129, No. 1903, 1881); **14** (x, 49; xvi, 57). On elm bark.

— **rubiginosum** Cooke & Massee in **14** (xvi, 78, 1888); Sacc. x, 511; **8**, 276. On leaves, Scotland.

Cladosarum olivaceum Yuill & Yuill gen.nov. in **28** (xxii, 199*, 1938). From a culture of *Aspergillus niger*; perhaps a mutant.

Coniosporium carbonaceum Cooke & Massee in **14** (xvi, 79, 1888); Sacc. x, 569; **8**, 357. On *Spiraea*.—The genus *Coniosporium* is based on *C. olivaceum* Link ex Fr.; Mason, *Annotated Acc.* List II, Fasc. 2, found the type specimen to be dictyosporous. *C. olivaceum* was described very vaguely; Mason found the specimen to resemble that figured as *Sporidesmium Peziza* Cooke & Ellis in **14** (iv, 178*). Cooke recorded *C. olivaceum* from Scotland, **14** (xvi, 96), but Massee's description, **8**, 357, shows it to have been something else. Perhaps *Coniosporium* Sacc. 1880 should be conserved against *Coniosporium* Link ex Fr. Meanwhile we include two species under *Coniosporium*, and two under *Papularia*.

— **Physciae** (Kalchbr.) Sacc. **14** (iv, 119, 1876); **8**, 357; **119**. On *Physcia*, Norfolk.

Coremium coprophilum Berk. & Curt. Listed **14** (xvii, 9, 1888). On rabbit dung, Kew. *Coremium* is *Penicillium* with coremia.

— **niveum** Corda. **40** (ix, 172, 1887). On a rhizome, Scotland.

— **vulpinum** Cooke & Massee in **14** (xvi, 81, 1888); Sacc. x, 687. On wolf's dung, locality unknown.

α **Crustulariella depraens** (Cooke) von Höhnelt gen.nov. in *Frag. Myk.* No. 997, 1916; *Polyactis* Cooke in **73** (ii, 141*, 1885). *Botrytis* Sacc. in *Syll.* iv, 134; **8**, 319; **89**, 201*; **5**, 460. On leaves of *Acer Pseudoplatanus*. See also ref. in *Rev. Appl. Myc.* ix, 690.

Cylindrium cylindricum (Corda) Lindau. **28** (111, 147). *C. Cordae* 'Grove nec Sacc.' in **27** (xxii, 196). As *C. Cordae* Sacc.: **8**, 284; **7**, 328. As *Fusidium*: Vize Exs. 334. On oak leaves.

— **flavovirens** (Ditm. ex Fr.) Bon. **8**, 285; **7**, 328. As *Fusisporium*: **20**, 351; Berk. Exs. 213. As *Fusidium*: **39**, t. 102. 1824; **51**, 464; **58**, 209; **15**, 609; **13**, 283;

- Vize Exs. 139. As *Cylindrium aeruginosum* (Link) Lindau: **28** (v, 17); **71** (xl, 54). As '*Fusidium sulphureum* Link': **14** (xvi, 58), see **8**, 282. On fallen leaves.
- Cylindrium griseum** Bon. **37** (1907, 242); **28** (iii, 147, 223 and 247); **70** (1936, 410). On leaves.
- **heteronemum** Sacc. **71** (xxviii, 148), Ireland. Recorded as British in Sacc. iv, 38, but in error as his reference shows; **14** (xvi, 58) and **8**, 285 may be based on Saccardo's entry.
- Cylindrodendrum album** Bon. Recorded **28** (xx, 4, 1935; xxii, 218). On catkins.
- Dematium hispidulum** Fr. **20**, 338, 1836; **19** (i, vi, 435, No. 234); **8**, 382*. As *Sporodum conopleoides* Corda: **15**, 585*; **40** (ii, 311; v, 324); **13**, 274; Vize Exs. 69. On dead grasses.
- **vinosum** Massee in **14** (xxi, 7*, 1892); Sacc. xi, 614; **8**, 383. On paper.
- Dematophora necatrix** Hartig. **89**, 161*; **112**, 173; numerous records as *Rosellinia*, a stage not yet found in Britain: see list in **28** (xxiv, 155). On *Pyrus*, etc. See E. W. Mason, *Annotated Acc. List II*, Fasc. 3.
- Echinobotryum atrum** Corda. **19** (2, v, 460, No. 457 bis, 1850); **15**, 487*; **40** (viii, 189); **71** (2, iv, 26); **8**, 365*; **7**, 337; **34** (xvii, 292*); Mason, *Annotated Acc. List II*, Fasc. 2; Berk. **19** (i, i, 260, No. 124, 1838) as *Dematium echinobotryum* Fr. Reported 'on *Stysanus*' etc.: the *Echinobotryum* and the *Stysanus* are two states of the same fungus.
- **leve** Sacc. **27** (xxiv, 200, 1886); **8**, 366; **34** (xvii, 292*, 'on *Stysanus*'). In soil, etc.
- Fusidium Asteris** Phill. & Plowr. in **14** (vi, 23, 1877); Sacc. iv, 29; **8**, 282. On leaves of *Aster*.
- **Deutziae** Cooke in **14** (xvi, 48, 1887); Sacc. x, 516; **8**, 282; **89**, 193*. On *Deutzia*, London.
- **griseum** Link ex Wallr. **120**, 544, 1821; **39**, t. 102, 1823; **51**, 464; **15**, 609; **40** (v, 9); **14** (xvi, 57); **8**, 282; **7**, 328; **71** (xxviii, 148); Vize Exs. 140; Cooke Exs. 198; **20**, 352 as *Fusisporium*. On leaves.
- **lycotropum** Preuss. **27** (xxiv, 198, 1886); **8**, 282. On stems, Warwicks.
- **maritimum** Sutherl. in **32** (xv, 41*, 1916); **28** (v, 430); Sacc. xxv, 644. On *Laminaria* and *Pelvetia*, Orkney and Dorset.
- **viride** Grove in **27** (xxiii, 164*, 1885); Sacc. iv, 26; **8**, 281; **27** (lvi, 344); **7**, 327; **34** (xvii, 288). On stems, etc.
- Geotrichum candidum** Link ex Sacc.? **8**, 289, 1893; **35** (1914, 149); **71** (xl, 54). On soil, etc. Loubière, *Thèses Fac. Sci. Paris*, 1924, and some other mycologists consider *G. candidum*, the type species of the genus, a synonym of *Oospora lactis*, i.e. that *Geotrichum* is one of the *Gloiosporae*.
- **matalense** (Castellani) Castellani var. **Chapmani** Castellani in *J. Trop. Med. Hyg.* Sept. 15, 1932*; *Oidium* sp. in **28** (xiv, 291*). In sewage. Dodge, *Medical Mycology*, refers it to *Pseudomonilia*.
- **roseum** Grove in Sacc. *Syll.* iv, 40, Apr. 1886 and **27** (xxiv, 198*); **27** (l, 11); **87** (xii, 165); **22**, Bull. 79. On the ground. Sydow made this the type of a new genus *Allonema* in **102** (xxxii, 283, 1934).
- Gibellula araneum** (Schwein.) Syd. **28** (xvii, 176, 1932). On spiders.
- [**Glenospora Curtisii** Berk. & Desm. **71** (xxviii, 149, 1910). Ireland. A *Septobasidium*. See **28** (xii, 105) and Couch's Monograph.]
- Gonatobotrys flava** Bon. **14** (xvi, 63, 1887); **8**, 333*; **28** (vi, 87). On wood etc.
- **simplex** Corda. **18**, 354, 1860; **15**, 616*; **27** (xxxv, 8); **8**, 333; **7**, 334; **71** (xliib, 53). On old plants.
- Gonatorrhodiella Highlei** A. L. Smith in **28** (iii, 36*, 1908); Sacc. xxii, 1302. On bulbs, London.
- **parasitica** Thaxt. **28** (xxi, 11, 1937). On *Hypomyces*, Devon.
- Gonatoporum puccinioides** (DC. ex Fr.) Corda. **19** (2, vii, 100, No. 519, 1851); **15**, 585*. As *Arthrimum*: **19**, No. 236; Berk. Exs. 311. As *Goniosporium*; **8**, 374*; **7**, 338*; *Torula Eriophori* Berk. in **20**, 359, 1836. On *Carex*, etc.

- Graphiopsis chlorocephala** (Fres.) Trail gen.nov. in 40 (x, 75, 1889); 40 (x, 281). *Haplographium chlorocephalum* (Fres.) Grove in 60 (xxi, 198*, 1885); 40 (ix, 172); 27 (xli, 259*); 28 (ii, 74). On *Carex*, etc.
- **Desmazierii** (Sacc.) von Höhnelt. As *Graphium*: 14 (xvii, 11, 1888); 8, 455. On wood, stage of *Rosellinia Desmazierii* (B. & Br.) Sacc. This is *Graphiopsis Bainier*, which is antedated by *Graphiopsis* Trail (above); it is a good *Dematophora*.
- Graphiothecium parasiticum** (Desm.) Sacc. 14 (xvii, 11, 1888); 8, 459*; 37 (1907, 244). On old leaves.
- Gyroceras Plantaginis** (Corda) Sacc. 14 (xvi, 97); 8, 365*. As *Torula*: 19 (i, vi, 439, No. 252, 1841); 15, 478. On *Plantago*. Linder 101 (xviii, 5) transferred it to *Helicoceras*.
- Hadrotrichum anceps** Sacc. 28 (vi, 373, 1920). On *Arrhenatherum elatius*, Wisley.
- **microsporum** Sacc. & Malbr. 40 (ix, 41, 1887) as 'var. *majus*' (a nomen nudum). On *Agrostis*.
- **virescens** Sacc. & Roum. 28 (v, 243, 1916); 27 (lx, 176*); 71 (xlii, 54). On *Agrostis*.
- **virescens** var. **Poae** Sacc. 27 (lx, 176, 1922); 28 (viii, 253). On *Poa*.
- Haplaria grisea** Link ex Chev. 120, 552, 1821; 15, 599*; 13, 278; 8, 304*; 7, 331; 71 (xxviii, 148); 20, 342, 1836 as *Botrytis*. On *Sparanium*, etc.
- Haplobasidium pavoninum** von Höhnelt. 28 (xxii, 266*, 1939). On *Aquilegia*, Scilly.
- Harpographium graminum** Cooke & Massee in 14 (xvi, 81, 1888); Sacc. x, 696; 8, 458*. On straw, Hampstead.
- **rhizomorphum** (Mont.) Sacc. As *Graphium*: 7A, 300, 1904; 7, 346. On rhizomorphs of *Armillaria mellea*, Yorks.
- Hormiscium callisporum** Grove in 27 (l, 16*, 1912); Sacc. xxv, 765; 27 (liv, 221). On Umbelliferae.
- **Centaurii** (Fuckel) Sacc. 28 (iv, 327, 1914). On *Erythraea*, Kent.
- **laxum** Wallr. 70 (1936, 416). On *Urtica*, Ireland.
- **pinophilum** (Nees ex Fr.) Lindau. 70 (1936, 416). As *Torula*: 14 (iv, 119); 40 (iii, 317); Cooke Exs. ii, No. 335. As *H. pithyophilum*: 8, 364; 35 (1915, 147). On conifers. *H. pithyophilum* var. *myrmecophilum* Bayliss Elliott was proposed in 28 (v, 139, 1915), on ants' nests.
- **splendens** (Cooke) Sacc. in Syll. iv, 264; 8, 364*. *Torula* Cooke in 14 (iii, 178*, 1875); 13, 229; 40 (iii, 317; iv, 347); 28 (iv, 205). On bark.
- **stilbosporum** (Corda) Sacc. 14 (xvi, 97); 40 (ix, 172; x, 281); 8, 364. As *Torula*: 15, 477, 1871; Vize Exs. 116. On branches.
- Hormodendrum chartarum** (Cooke) Grove in 74 (vi, 47, 1911); *Penicillium* Cooke (sine diag.) in 59 (1871, 11*); 15, 602. *Haplographium* Sacc. in Syll. iv, 305; 8, 381; 35 (1912, 92). On wall-paper, London.
- **Hordei** Bruhne. 28 (iii, 35, 1908); 5, 466; 23 (xviii, 670); 35 (1909, 419). On barley, melons, etc.—Doubtless a form of *Cladosporium herbarum* (see *Flora Italica*).
- **Hordei** var. **parvispora** A. L. Smith in 28 (iii, 35*, 1908). On paper, Hants.
- **olivaceum** (Corda) Bon. 28 (ix, 187, 1924). On old plums.
- Hyalodendron album** (Dowson) Diddens, gen.nov. in *Zentralbl. Bakt.* 2, xc, 316, 1934. *Cladosporium* Dowson in 56 (xlix, 221*, 1924); 112, 337; 85 (xxviii, 50); 79 (vi, 18; vii, 20 and 36; xi, 58, the last two pages as *Erostrothea*). On *Lathyrus*, etc.—*Erostrothea multiformis* Martin & Charles was described as the perfect stage in America in 99 (xviii, 844); not reported in Britain.
- Hymenostilbe arachnophila** (Ditm. ex Fr.) Petch in 35 (1931, 249); 28 (xvii, 176). As *Isaria*: 19, No. 117; 15, 548; 8, 447; 7, 345. On spiders.—Petch later 28 (xviii, 75) considered *Hymenostilbe* Petch probably a synonym of *Akanthomyces* Lib.
- **muscaria** Petch gen.nov. in 35 (1931, 101); 28 (xvii, 176); 35 (1932, 133). On flies; conidial stage of *Cordyceps Forquignoni* Quél., 28 (xxi, 298).

- Hymenostilbe sphecophila** (Ditm. ex Fr.) Petch in **28** (xxi, 55, 1937); **28** (xxi, 298). As *Isaria*: **31** (xvii, 378*, 1882); **33** (ix, 16); Cooke, *Veg. Wasps*, p. 50*; **28** (xvii, 177). On *Hymenoptera*, stage of *Cordyceps sphecocephala*.
- Hyphoderma roseum** (Pers. ex Fr.) Fr. **14** (xvi, 60); **8**, 304. As *Hyphelia*: **40** (ii, 280, 1874). On wood.
- Isaria albida** (Fr.) Sacc. **8**, 449; **7**, 345. *Pachnocybe albida* (Fr.) Berk. in **20**, 335, 1836; **15**, 551; Berk. Exs. 52. On wood. See Petch **28** (xix, 34) on *Isaria*. If the genus *Isaria* is to be retained, the third species of Fries's *Systema*, *I. farinosa*, should be chosen as lectotype.
- **brachiata** Batsch ex Fr. **19** (i, i, 49, No. 30, 1837); **15**, 548; **40** (viii, 228); **8**, 448; **7**, 345; **28** (xxi, 66). On old fungi, etc.
- **citrina** Pers. ex Fr. **19** (i, i, 49, No. 31, 1837); **15**, 548; **13**, 263; **8**, 449; **7**, 345. On fungi, etc.
- **clavata** Ditm. ex Fr. **8**, 450, 1893. On wood.
- **cretacea** van Beyma in *Zentralbl. Bakt.* 2, xci, 350*, 1935. From a packet of yeast, Surrey.
- **dubia** Delacr. **35** (1932, 133); **28** (xvii, 176; xviii, 67; xxi, 297). On insects; a stage of *Cordyceps gracilis*.
- **farinosa** Fr. **20**, 328; **15**, 770*; **8**, 447*; Cooke, *Veg. Wasps*, p. 178*; **33** (ix, 4); **23** (xx, 25); **71** (xxviii, 150); Ramsbottom, *Handbook Larger British Fungi*, p. 192; **28** (xvii, 175; xix, 38; xx, 12, 38 and 216); **35** (1932, 107). *Clavaria farinosa* (Holmsk.) Dickson in **44** (ii, 25, 1790); **42**, t. 308; **38** (iv, 338). **120**, 562 as *I. crassa* Link; **14** (xvii, 9); **120**, 562 as *I. velutipes* Link. On insects.
- **felina** Fr. **19** (3, xv, 402, No. 1050, 1865); **15**, 548; **8**, 448; **40** (v, 34; vii, 54); **7**, 345. On dung of cats and dogs.
- **Friesii** Mont. **19** (2, v, 464, No. 491, 1880); **15**, 549; **8**, 449; **7**, 345. On bark.
- [— **fuciformis** Berk. **8**, 450; **89**, 241*; **31** (1873, 596); **81**, 57*, etc. This is *Corticium fuciforme* (Berk.) Wakef.]
- **intricata** Fr. **19** (i, i, 259, No. 118, 1838); **15**, 549; **13**, 263; **40** (vii, 271); **8**, 448; **7**, 345; **28** (xxi, 67). On fungi.
- **leprosa** Fr. **28** (xvii, 175, 1932; xviii, 68); **35** (1932, 108). On insects; it may be *I. farinosa* parasitized by *Sporotrichum Isariae*.
- **muscigena** Cooke & Muller in **14** (xvi, 81, 1888); Sacc. x, 690; **8**, 449. Amongst moss, Eastbourne.
- **puberula** Berk. in **19** (i, vi, 432*, No. 221, 1841); Sacc. iv, 595; **15**, 549; **8**, 450. On old flowers of *Dahlia*, Northants.
- **Sphingum** Schwein. ex Fr. **19** (5, i, 27, No. 1710, 1878); **13**, 263; **8**, 447; **33** (ix, 35); **35** (1932, 108). On insects. Petch **28** (xviii, 75) considers that all European records should be assigned to *Akanthomyces aculeata*, q.v.
- **spumarioides** Cooke in **14** (iv, 69, 1875); Sacc. iv, 592; **8**, 450. On bark, Knowsley.
- **sulphurea** Fiedler. **27** (xxiv, 205, 1886); **8**, 448; **33** (xvi, 86); **7**, 345. On dung of various animals.
- **tomentella** Fr. **19** (5, i, 27, No. 1711, 1878); **14** (vi, 126); **8**, 450. On wood, etc.
- **umbrina** Pers. ex Wallr. **20**, 236, 1836; **114** (ii, 33); **15**, 794; **8**, 449; **35** (1913, 178); Rabenh. Herb. Myc. No. 172, coll. Broome. *Lycoperdon acariforme* Sow. in **42**, t. 146, 1798. *Instilale acariforme* Fr. in *Systema*; **28** (xvi, 147). On *Hypoxylon coccineum*; probably its conidial stage. See *Trichosporium Tulasnei*.
- Martensella pectinata** Coemans. **28** (vi, 371, 1920). In soil, Herts.
- Memnoniella echinata** (Rivolta) Galloway in **28** (xviii, 165*, 1933). From cotton yarn.
- Meria Laricis** Vuill. **5**, 462, 1910; **28** (vii, 10; xiv, 181); **94** (xv, 57); Hiley, *Diseases of the Larch*; **112**, 352; *Oxford Forestry Memoir*, No. 15, 1933; **76** (vi, 113; x, 79); **71** (xlb, 55). On *Larix*.
- Metarrhizium Anisopliae** (Metsch.) Sorok. **35** (1932, 167); **28** (xvi, 67; xvii, 174). On insects.

- Monilia aurea** Gmelin ex Sacc. ? 48 (v, 234); 8, 283. As *Oidium*: 20, 348, 1836; 15, 603; 13, 280; 7, 328; Vize Exs. 251. As *M. hesperidica* Sacc.: Cooke Exs. II, No. 632; Vize Exs. 142. On bark, etc.
- **candicans** Sacc. 28 (II, 32, 1903); Grove 27 (LVIII, 250) considered *M. caespitosa* Purton to be synonymous. On old wood.
- **candida** Bon. 35 (1920, 403). On an owl pellet, Yorks.
- **cinerea** Bon. 33 (xxxiii, 361*, 1919; xxxiv–xxxvi, XLIV); 104 (iv, VII, IX, XI–XIII); 33 (xxxvi, 262); 70 (1928, 63*); 96 (III, 130); 65 (xxx, 339); 79 (I); 93, 134. On *Prunus*, *Pyrus*, etc., stage of *Sclerotinia laxa* Aderh. & Ruhl. f. *Mali* (Wormald) Harrison.
- **Crataegi** Died. 28 (xxii, 206, 1939). On *Crataegus*. As *Sclerotinia*: 77 (1926/27, II, 86, 1928); 31 (CI, 426; CII, 47).
- **fructigena** Pers. ex Westend. ? 8, 283; 5B, 300 and 434; 56 (xix, xxiii, xxv, xxvi, xxvii); 7, 328; 89; 93; 66 (1905, 7); 78 (1915, 1916, 1919); 33 (xviii, xix, xxxiii, xxxiv, xxxvi, xli, XLIV, XLVII, XLVIII, L); 28 (x, 109; xv, 102); 79 (I, II); 103 (iv, 76); 104 (II, IX, x, XII). As *Oidium*: 20, 349, 1836; 15, 604; 13, 280. On apples, etc., stage of *Sclerotinia fructigena* Aderh. & Ruhl.
- **glasti** Plowr. in 27 (xxxix, 385, 1901); Sacc. XVIII, 501. On wood, Cambs.
- **humicola** Oudem. var. **brunnea** A. L. Smith in 28 (III, 120, 1909); Sacc. xxii, 1245. On wood, Scotland.
- **Konigi** Oudem. 28 (II, 32, 1903). From Scotland.
- **pruinosa** Cooke & Massee in 14 (xvi, 78, 1888); Sacc. x, 518; 89, 169; 34 (xvii, 289*). On old leaves of *Caladium* and in soil.
- **racemosa** Pers. ex Fr. 20, 345; 15, 606; 48 (II, 259). *M. caespitosa* Purton in 55 (III, 320*, 1821); 8, 284. 38 (II, 784, 1776) as *Mucor caespitosus*; 111, t. 132. On decaying vegetation. See *M. candicans*.
- **sitophila** (Mont.) Sacc. 35 (1912, 88); 27 (LXIX, 67); 28 (xix, 215); 116, 91. *Oidium Lupuli* Matth. & Lott in *Microscope in Brewery and Malthouse*, p. 86, 1899; *Monilia Lupuli* (Matth. & Lott) Massee ex Grove in 74 (vi, 42*, 1911); 34 (xvii, 289) as '*Oospora Lupuli*'. *Oidium aurantium* Cooke in 14 (I, 21, 1872); Cooke Exs. 448; *Oospora aurantia* (Cooke) Sacc. & Vogl. in *Syll.* IV, 22; 14 (xvi, 57); 8, 280. On spent hops, etc.; stage of *Neurospora*.
- **tetrasperma** Ramsb. & Steph. nom. nov. in 28 (xix, 218*, 1935). From charred *Ulex*, Woolwich; stage of *Neurospora*.
- Monosporium coprophilum** Cooke & Massee in 14 (xvi, 10, 1887); Sacc. x, 535; 14 (xvi, 61); 8, 311. On dung, Kew.
- **maritimum** Sutherl. in 32 (xv, 42*, 1916); Sacc. xxv, 692; 28 (v, 430). On old *Laminaria*, Dorset.
- **olivaceum** Cooke & Massee in 14 (xvi, 78, 1888); Sacc. x, 535; 8, 311*; 35 (1905, 189); 7, 371. On bark.
- **saccharinum** Berk. & Br. in 19 (4, XI, 345*, No. 1379, 1873); Sacc. IV, 116; 14 (II, 137; xvi, 61); 8, 311. On decayed substances, Batheaston.
- Monotospora affinis** A. L. Smith & Ramsb. in 28 (v, 167, 1915); Sacc. xxv, 772. On wood, Scotland.—See E. W. Mason, *Annotated Acc. List II, Fasc. 3* for *Monotospora*.
- **asperospora** Cooke & Massee in 14 (xvi, 79, 1888); Sacc. x, 588; 8, 378. On dead *Clematis*, Shere.
- **Daleae** Mason nom. nov. in *Annotated Acc. List II, Fasc. 2*, p. 50*, 1933. '*Basidiosporium gallarum*?' in 102 (x, 466*, 1912); 28 (IV, 184; XII, 153); Mason, op. cit. Fasc. I, 25. From soil.
- **megalospora** Berk. & Br. in 19 (2, xii, 462*, No. 759, 1854; Sacc. IV, 299; 15, 568*; 13, 269; 40 (II, 310; IX, 172); 8, 378; 46 (II, 215); 7, 339. On bark.
- **megalospora** var. **fusispora** Sacc. in *Syll.* IV, 299; 8, 378; 19 (3, VII, 381, No. 943, 1861) as 'a form... with broadly fusiform spores.' On a stump.
- **pumila** (Massee) Sacc. in *Syll.* IV, 300; 8, 377*; 7, 388. *Helminthosporium* Massee in 68 (2, v, 758*, 1885). On *Graphium* and wood.
- **repens** (Cooke) Massee in 8, 377, 1893. *Periconia* Cooke in 14 (xvi, 79, 1888); Sacc. x, 578. On stems.

- Monotospora sphaerocephala** Berk. & Br. in 19 (3, III, 361*, No. 819, 1859); Sacc. IV, 299; 15, 569; 73 (1877, t. 24); 14 (IV, 82; XVI, 98); 48 (V, 9); 8, 377; 7, 338; Mason, *Annotated Acc. List II*, Fasc. 2. On wood.
- Nematogonium aurantiacum** Desm. 15, 589*; 46 (II, 216); 8, 333*; 7, 334; Vize Exs. 337. *Aspergillus aurantiacus* (Desm.) Berk. in 19 (I, VI, 436*, No. 237, 1841); Berk. Exs. 272. On bark.
- **aurum** (Berk.) Berk. in 18, 348, 1860; Sacc. IV, 170; 15, 590; 13, 275; 8, 334. *Aspergillus* Berk. in 20, 340, 1836; 19, No. 237. On bark.
- **humicola** Oudem. 102 (x, 466*, 1912); 28 (IV, 183). From soil, Woburn.
- Nigrospora sphaerica** (Sacc.) Mason in 28 (XII, 158, 1927). *Hadrotrichum arundinaceum* Cooke & Massee in 14 (XVI, 11, 1887); Sacc. x, 588; 14 (XVI, 97); 8, 378*. On *Arundo*, Kew.
- Oedocephalum clavatum** A. L. Smith in 27 (XLI, 259*, 1903); Sacc. XVIII, 508; 28 (II, 60). From a hyacinth root.—See also *Rhopalomyces*.
- **glomerulosum** (Bull. ex Fr.) Sacc. 28 (I, 151, 1901; II, 57); 33 (XVI, 80*); 27 (I, 12*); 7, 329. *O. roseum* Cooke in 14 (I, 184, 1873); Sacc. IV, 48; 14 (II, 139*); 8, 289; Cooke Exs. 550. On dung, etc. See Thaxter, *Bot. Gaz.* XVI, 17, and Matruchot, *Recherches sur les développements de quelques Mucidinées*, 1892.
- **laeticolor** Berk. & Br. in 19 (3, xv, 403*, No. 1056, 1865); Sacc. IV, 48; 15, 566*; 8, 289*; 28 (II, 141). On dung.
- **ochraceum** Massee & Salm. in 33 (XVI, 80*, 1902); Sacc. XVIII, 509. On rabbit dung, Kew.
- **Preussii** Sacc. 14 (XVI, 59, 1887); 8, 290; 27 (XXXV, 8). On old stems.
- **sulphureum** Cooke & Massee in 14 (XVII, 3, 1888); Sacc. x, 521; 8, 290. On old rope.
- Oidium erumpens** Cooke & Massee in 14 (XVI, 49, 1887); Sacc. x, 520; 8, 287; 89, 60*. On leaves of *Rivea*, Kew.—*Oidium* stages known to belong to Erysiphaceae are omitted here. *O. erumpens* is doubtful.
- [— **pactolinum** Cooke in 14 (XII, 99, 1884); Sacc. IV, 44; 8, 288; 89, 167* in error as *Chromosporium*. On *Jasminum*, Isleworth. The type specimen bears no *Oidium*.]
- Ovularia Asperifolii** (Sacc.) Sacc. 14 (XIII, 51, 1884; XVI, 62); 8, 323. On *Symphytum officinale*, Norfolk.
- **Berberidis** Cooke in 14 (XIII, 98, 1885); Sacc. IV, 144; 14 (XVI, 62); 8, 324; 89, 186*. On *Berberis asiatica*, Kew.
- **Bistortae** (Fueckl) Sacc. 40 (VIII, 228, 1886; x, 67); 27 (XXXVI, 182); 28 (III, 120); 35 (1937, 287). On *Polygonum Bistorta*.
- **carneola** Sacc. 40 (IX, 41, 1887; x, 66). On *Scrophularia nodosa*, Scotland.
- [— **Clematidis** Chitt. ex Cooke belongs to the Erysiphaceae.]
- **decipiens** Sacc. 40 (x, 281, 1890); 28 (IV, 181); 71 (XLIIB, 53). On *Ranunculus acris* and *R. repens*.
- **destructiva** (Phill. & Plowr.) Massee in 8, 320, 1893; 28 (XIII, 311); 27 (XLVII, 347); 70 (1936, 410); 65 (XXX, 244 and 345). *Ramularia* Phill. & Plowr. in 14 (VI, 22*, 1877); Sacc. IV, 198; 14 (XVI, 64); Cooke Exs. II, No. 538; Vize Exs. 74. On *Myrica Gale*. See *O. rufibasis*.
- **deusta** (Fueckl) Sacc. 71 (XLII, 53, 1934); 70 (1936, 411); 28 (XXII, 218). On *Lathyrus*.
- **duplex** Sacc. Recorded 28 (XXI, 4, 1937 and XXII, 218).
- **epilobiana** Sacc. & Fautr. 70 (1936, 411). On *Epilobium*, Ireland.
- **exigua** (W. G. Smith) Sacc. in *Syll.* XI, 598; 89, 248; *Peronospora* W. G. Smith in 81, 12*, 1884. On *Trifolium* and *Lotus*.
- [— **Filipendulae** Cooke nomen nudum in 14 (XVI, 62, 1887). On *Spiraea*.]
- **haplospora** (Speg.) Magnus. Recorded 28 (XX, 12) on *Alchemilla arvensis*, Norwich.
- **interstitialis** (Berk. & Br.) Massee in 8, 322, 1893; 89, 56*; 35 (1909, 27). *Peronospora* B. & Br. in 19 (4, v, 34, No. 1455, 1875); 13, 278; 31 (XXV, 564*, 1886); 52, Ed. 4, 237; *Ramularia* Trail in 40 (VIII, 228, 1886). On *Primula*; perhaps the same as *O. primulana*.

- Ovularia Lamii** (Fuckel) Sacc. 14 (xvi, 62, 1887); 8, 324; Cooke Exs. II, No. 348 as *Ramularia*. On *Lamium*.
- **obliqua** (Cooke) Oudem. in 105 (1883, 85); 8, 324; 7, 333; 70 (1936, 411). *Peronospora* Cooke apud B. & Br. in 19 (3, xv, 403, No. 1058, 1865); 15, 597; 13, 278; nomen nudum in 52, 160*, 1865. *Ramularia* Oudem., 1872; 40 (vii, 272). On *Rumex*; stage of *Ovosphaerella Lapathi* (see ref. in *Rev. appl. Myc.* 1, 453).
- **ovata** (Fuckel) Sacc. Recorded 28 (v, 7, 1915) as *Ramularia*.
- **primulana** Karst. 40 (ix, 45 and 168, 1887; x, 67); 27 (I, 13*); 28 (v, 363; vii, 10; xix, 9); 48 (xxi, 112); 71 (xlii, 53). On *Primula*. See *O. interstitialis*.
- **rufibasis** (Berk. & Br.) Massee in 8, 322, 1893; 28 (iv, 37). *Peronospora* B. & Br. in 19 (4, xv, 34, No. 1456, 1875); Sacc. vii, 261; 52 (Ed. 4, 237); 13, 278. *Ramularia* Trail in 40 (vii, 272, 1884); 40 (x, 67). On *Myrica* Gale. Trail 40 (viii, 228) considered it the same as *O. destructiva*.
- **sphaeroidea** (Sacc.) Sacc. 27 (xxii, 197*, 1884); 40 (viii, 228; x, 66); 28 (iv, 181; xvii, 14); 71 (xlii, 53); Vize Exs. 574. On *Lotus*.
- [— **Syringae** Berk. in 31 (xvi, 665*, 1881) is *Phytophthora Syringae* (Kleb.) Kleb.]
- **Veronicae** (Fuckel) Sacc. 40 (x, 66); 8, 323; 28 (iv, 37; xii, 5); 70 (1936, 411). 19 (5, vii, 130*, No. 1917, 1881) as *Ramularia Veronicae* sp. nov., but Saccardo in *Syll.* iv, 143, considered it the same as *R. Veronicae* Fuckel; 40 (vii, 36; viii, 228); 14 (x, 50; xvi, 62). On *Veronica*.
- Pachybasium hamatum** (Bon.) Sacc. var. **candidum** Sacc. Recorded 104 (xii, 235, 1934) as *P. candidum* Sacc. in strawberry roots, Surrey.
- **Tilletii** (Desm.) Oudem. 28 (iii, 224 and 316); 27 (lxxiv, 50*). 19 (2, vii, 101, No. 529, 1851) as *Botrytis*; 15, 591; 8, 316; 7, 332; 71 (xxviii, 148). On moss, etc.
- Paecilomyces hibernicum** Kennelly in 70 (xix, 513*, 1930). In butter, Ireland.
- sp. *Eidamia catenulata* Horne & Williamson in 33 (xxxvii, 430*, 1923); 116, 87; 66 (ccxxv, 99). In wood. See Thom, *The Penicillia*, p. 545, and Mason, *Annotated Acc. List II*, Fasc. 3, 89. *Paecilomyces* may perhaps be placed better in the *Gloiosporae*.
- Papularia Arundinis** (Corda) Fr. E. W. Mason, *Annotated Acc. List II*, Fasc. 2, 1933. As *Gymnosporium*: Currey 68A (1857, t. 8); 15, 488*; 40 (viii, 190). As *Coniosporium*: 8, 356*; 70 (xix, 558*). On reeds, etc.
- **sphaerosperma** (Pers. ex Fr.) von Höhnelt. E. W. Mason, loc. cit.; *J. Oil Col. Chem. Ass.* xxii, 184. As *Melanconium*: Berk. 19, No. 251, 1841; 15, 467; 37 (1918, 171*; see E. W. Mason re Grove's subspecies). *Coniosporium* E. W. Mason in 'List of Cultures, Centralb. Schimmelcult.', July 1931; Grove 1 (ii, 318*); 27 (lxxvi, 359); 40 (x, 281) as *C. Arundinis* var. *phaeospermum*. On reeds, etc.
- Penicillium abnorme** Berk. & Br. in 19 (5, vii, 130*, No. 1914, 1881); Sacc. iv, 81. On *Trientalis*. Massee 8, 302, found no specimen. Not a *Penicillium*, teste Thom, p. 575.—Several other British records of *Penicillium* are meaningless. Thom's *The Penicillia* has been examined, and is sometimes cited here as 'Thom'. See also G. Smith, *Industrial Mycology*.
- **asperulum** Bain. 28 (viii, 138, 1923), apparently compiled on p. 140 as *P. 'anomalum'*. On meat.
- **bicolor** Fr. 18, 350, 1860; 15, 602; 8, 302; 7, 331. On acorn, etc.
- **biforme** Thom. 102 (xii, 39*, 1914); 28 (v, 161). From soil, Woburn.
- **brevicompactum** Dierckx. 70 (xix, 554*, 1930); 66 (ccxxv). In butter, etc.
- **candidum** Link ex Fr. 120, 554, 1821; 20, 344; 8, 300; 75 (xii, 489); 7, 331; 15, 602 with var. *Coremium*=*Coremium candidum* Nees; 13, 280. An uncertain species.
- **carminoviolaceum** Dierckx. 33 (1937, 499). From preserved plants.
- **carneolutescens** G. Smith in 28 (xxii, 253*, 1939). From dried hops.
- **Charlesii** G. Smith in 28 (xviii, 90*, 1933). From maize.
- **chrysogenum** Thom. 28 (x, 111, 1924); 115, 100; 66 (ccxxv). In apples, etc.

- Penicillium citrinum** Thom. 66 (ccxxb, 269, 1931); 33 (1937, 509). Sources uncertain.
- **coffeicolor** Berk. & Br. in 19 (4, xvii, 142, No. 1614, 1876); Sacc. iv, 83; 8, 303. On Pasteur's solution, London. 'Possibly a *Scopulariopsis*', teste Thom.
- **commune** Thom. 66 (ccxxb, 87, 1931); *J. Oil Col. Chem. Ass.* xxii, 184. In building materials, etc.
- **corymbiferum** Westling. Thom, p. 424; 66 (ccxxb); 28 (xviii, 249); 22, Bull. 117. In bulbs, etc.
- **crustaceum** Fr. 20, 344, 1836; 27 (v, 366); 15, 601; 13, 279; 74 (vii, 150*); Cooke Exs. II, No. 341. 'Var. *Coremium*' is reported. *Floccaria glauca* Grev. in 39, t. 301. An unknown species in the same category as *P. glaucum*.
- **crustosum** Thom in *The Penicillia*, p. 399, 1930; 66 (ccxxb). Isolated in Scotland.
- **cyclopium** Westling. 102 (xii, 39*, 1914); Thom, p. 384; 70 (xix, 555); 28 (xviii, 250); 22, Bull. 117. On lily bulbs, etc.
- **decumbens** Thom. 88 (see *Rev. Appl. Myc.* I, 44). On leather.
- **digitatum** Sacc. 66 (ccxxb); 67 (cvb, 375); 104 (ix, 257; x, 184; xii, 315; xiii, 225). On citrus fruits.
- **Duclauxi** Delacr. 66 (ccxxb, 90, 1931). From sand, Scotland.
- **expansum** Link emend. Thom. 120, 554, 1821; 88 (iv, 88; vi, 165); 22 (Misc. Publ. 33, p. 51); 28 (viii, 138; x, 110; xxii, 179); 33 (xxxvii, 343); 34 (xxv, 92); 116, 86 and 102; 79 (iv, v, xi, xii); 78 (1938, 87). On apples, etc.
- **Fieberi** Corda. This unknown species is recorded 53 (xv, 277, 1844) on insects.
- **flavocinereum** Biourge. *J. Oil Col. Chem. Ass.* xxii, 184, 1939. In rain-water, etc.
- **flavoglaucum** Biourge. Reported with the previous species.
- **fuscoglaucum** Biourge. Thom, p. 326; 66 (ccxxb). From 'fuse', Scotland.
- **glabrum** (Wehmer) Westling. 66 (ccxxb, 84); 102 (x, 464, 1912) as *Citromyces*; 74 (vii, 147*, 1912). In soil, beehives, etc.
- **Gladioli** McCull. & Thom. 22 (Bulls. 70, 79, 117*); 79 (vi, 21; xi, 55); 93, 207; 31 (3, lxxix, 35); 66 (ccxxb). On *Gladiolus* and sometimes on other bulbs.
- **'glaucum'** Link'. An undeterminable species frequently recorded, e.g. 55 (ii, 721, 1827); 120, 563; 8, 299*; 28 (i, 184); 74 (vii, 59); 5, 464, etc.
- **Godlewskii** Zaleski. 66 (ccxxb, 87). Isolated in Scotland.
- **guttulosum** Gilman & Abbott. *J. Oil Col. Chem. Ass.* xxii, 184, 1939. From rain-water, Sheffield.
- **hirsutum** Dierckx. Thom, p. 113; 22 (Bull. 117, 18). In hyacinth bulbs.
- **intricatum** Thom. 102 (x, 463, 1912). In soil, Woburn.
- **italicum** Wehmer. 5, 463, 1910; 67 (cvb, 375); 104 (x, 184). In oranges.
- **Johannioli** Zaleski. 70 (xix, 555, 1930). In butter, Ireland.
- **Kiliense** Weidemann. 66 (ccxxb, 90). From tobacco, Scotland.
- **lanosoviride** Thom in *The Penicillia*, p. 314, 1930; 66 (ccxxb). From water, Scotland.
- **lanosum** Westling. 88 (iv, 88, 1921; vi, 172). On leather. Thom, p. 317, refers to an isolation which, however, was not British, as implied; see 66 (ccxxb, 87).
- **lilacinum** Thom. 102 (xii, 43*, 1914); 34 (xv, 95); Thom, p. 334. In soil.
- **lividum** Westling. Thom, p. 205; 102 (xii, 52*, 1914); *J. Oil Col. Chem. Ass.* xxii, 184. In soil, etc.
- **luteum** Zukal. 28 (x, 111, 1924); 116, 104; 66 (ccxxb, 255). In apples, etc.
- **macrosporum** Berk. & Br. in 19 (5, ix, 183, No. 1978, 1882); Sacc. iv, 82; 8, 302. On *Lactarius*. Not recognised by Thom.
- **megalosporum** Berk. & Br. in 19 (4, xv, 34, No. 1457, 1875); Sacc. iv, 80. Described with spores up to 25 μ long. Massee 8, 301 found no specimen.
- **meleagrinum** Biourge. *J. Oil Col. Chem. Ass.* xxii, 184; 66 (ccxxb). In rain-water, etc.
- [— **Narcissi** A. Smith apud Brooks nomen nudum in 112, 119, 1928; 22 (Bull. 117, 92); disease reported by A. Smith 31 (3, lxxix, 35). On *Narcissus*.]
- **ovoideum** Preuss. 27 (L, 12*, 1912). On size. Thom considers Preuss's species undeterminable.

Penicillium oxalicum Currie & Thom. *J. Oil Col. Chem. Ass.* xxii, 184, 1939.
From rain-water.

- **pallidum** G. Smith in **28** (xviii, 88*, 1933). From cotton yarn.
- **pruriosum** Salisbury. Reported **14** (xvi, 60); **8**, 300. An undeterminable species, teste Thom.
- **puberulum** Bainier. **28** (x, 111, 1924). From apples.
- **pulvillorum** Turfitt in **28** (xxiii, 186*, 1939). From soil, Middlesex.
- **pusillum** G. Smith in **28** (xxii, 255*, 1939). On dried peas, ?England.
- **quadrifidum** Salisbury. **14** (xvi, 60, 1887); **8**, 300. In human blood. An unknown species.
- **Raistrickii** G. Smith in **28** (xviii, 90*, 1933). From cotton yarn.
- **roqueforti** Thom. **28** (xxii, 174*); **116**, 106; Thom, p. 278. In cheese.
- **roqueforti** var. **viride** Dattilo-Rubo in **28** (xxii, 178, 1938). From Cheshire cheese.
- **rugulosum** Thom. **102** (xii, 40, 1914); **28** (x, 111); **116**, 107. In soil, etc.
- **Sartoryi** Thom. **70** (xix, 556). **74** (vii, 148*, 1912) as *Citromyces subtilis* Bain. & Sart. In beehives and butter.
- **silvaticum** Oudem. **28** (viii, 253, 1923). In a culture. Thom considers *P. silvaticum* to be undeterminable.
- **sparsum** Grev. ex Fr. in *Systema* iii, 407; Greville in **39**, t. 58, 1823; **51**, 467; **20**, 344; **15**, 602; **13**, 279; **8**, 320. As '*P. candidum* Link': *Mem. Wern. H.N. Soc.* iv, 71*, 1822. On old plants, etc. Probably not a *Penicillium*, teste Thom.
- **spinulosum** Thom. **70** (xix, 556, 1930; **66** (ccxxv, 83). In water, etc.
- **stoloniferum** Thom. **102** (xii, 52, 1914); **28** (x, 111; xviii, 88); **116**, 108. In soil, etc.
- **subtile** Berk. in **19** (i, vi, 437*, No. 241, 1841); Sacc. iv, 80; **15**, 603; **8**, 301. In a dead willow, Northants. Berkeley's figure suggests *Sporendonema Salicis* Bain.
- **subtile** var. **ramosius** Grove in **27** (xxiii, 165, 1885); Sacc. iv, 80; **8**, 301. On wood.
- **terrestre** Jensen. Thom, p. 372; **66** (ccxxv, 88). In milk, etc.
- **Thomii** Maire. *J. Oil Col. Chem. Ass.* xxii, 184, 1939. In rain-water, Wales.
- **varians** G. Smith in **28** (xviii, 89*, 1933). From cotton yarn.
- **viridicatum** Westling. **102** (xii, 56, 1914); **88** (vi, 175); **104** (vii, 239); **66** (ccxxv, 88). In soil, etc.

Periconia alternata (Berk.) Sacc. in *Syll.* iv, 275; **8**, 370; **35** (1911, 293); *Aspergillus* Berk. in **19** (i, i, 262*, No. 126, 1838). *Sporocybe* Berk. in **19** (i, vi, 434, No. 227, 1841); **15**, 567; **40** (vi, 121; vii, 271); Vize Exs. 243. On paper. The type specimen is a *Stachybotrys*. See synonymy by von Höhnelt in *Centralbl. Bakt.* Abt. 2, LX, 14, 1923.

- **atra** Corda. **8**, 370*, 1893; **7**, 338. On grass, etc.
 - **byssoides** Pers. ex Corda. **8**, 369; **7**, 338; **37** (1911, 377). As *Sporocybe*: **20**, 333, 1836; **15**, 566; **73** (1877, t. 27); **13**, 269; Cooke Exs. 278; Vize Exs. 240 and *Fungi Brit.* 172. On stems, etc.—See Linder **100** (xxix, 659) on *Periconia*.
 - **circinata** (Mangin) Sacc. **28** (xxiii, 210, 1939). From wheat roots, Herts.
 - **Desmazieri** (Fr.) Bon. **27** (I, 17*, 1912). On stems, Warwicks.—See von Höhnelt (loc. cit.).
 - **minima** (Cooke) Sacc. in *Syll.* iv, 275; **8**, 371. *Sporocybe* Cooke in **14** (v, 118, 1877); **73** (1877, t. 27). On millboard.
 - **minutissima** Corda. **8**, 371, 1893. On *Alnus*.
 - **nigrella** (Berk.) Sacc. in *Syll.* iv, 274; **8**, 370; **7**, 338; **37** (1909, 376). *Sporocybe* Berk. in **19** (i, vi, 433*, No. 226, 1841); **15**, 567*; **13**, 269. On grass, etc.
 - **podospora** Corda. **8**, 370, 1893; **7**, 338; **35** (1907, 285). On Umbelliferae.
 - **pycnospora** Pres. **27** (xxxv, 8, 1897; L, 17*); **35** (1908, 310). On herbs.
- Phaeoisaria Cornui** (Bainier) Mason in *Annotated Acc. List* ii, Fasc. 3, 94, 1937. Recorded **28** (xv, 10, 1930) as *Graphium fissum* Preuss. On elm near Bristol.
- Polyscytalum fungorum** Sacc. **14** (xvi, 58, 1887); **8**, 285*; **28** (xxi, 275). Conidial stage of *Hypomyces asterophorus* Tul.; see Plowright **14** (xi, 6*, 1884). It is one of the Endosporae: see Brefeld, *Untersuch.* x, 189 as *Pyxidiphora Nyctalidis* Bref. & von Tafel.

- Polyscytalum sericeum** Sacc. 27 (LXX, 46, 1932); 108 (IX, 52). On acorn-cups and leaves.
- Ptychogaster albus** Corda. 2, 660; etc. Conidial stage of a polypore.
- Rhinotrichum aureum** Cooke & Massee in 14 (xviii, 27, 1889); Sacc. x, 531; 8, 308; 7, 331. On old agarics.
- **Bloxami** Berk. & Br. in 19 (2, vii, 177*, No. 541, 1851); Sacc. iv, 93; 15, 590; 8, 307; 35 (1907, 103). On wood.
- **decipiens** Cooke in 14 (xiv, 6, 1885); Sacc. iv, 93; 8, 307. On bark and moss.
- **decolorans** Cooke in 14 (v, 58, 1876); Sacc. iv, 92; 8, 306; 35 (1912, 90). On chips, etc.
- **lanosum** Cooke in 15, 591*, 1871; Sacc. iv, 92; 19, No. 1316; 8, 307; 7, 331; 37 (1911, 377); Vize Exs. 77, and 579. Cooke issued Exs. 356 as *Clinotrichum lanosum*, nomen nudum; he gave a description of '*Clinotrichum* gen. nov.' in 59 (1871, p. 10* of reprint), stating at the same time that it was a *Rhinotrichum*. On wall-paper.
- **niveum** Cooke & Massee in 14 (xvi, 10, 1887); Sacc. x, 532; 8, 306*; 7, 331; 28 (xvi, 5). On wood.
- **Opuntia** Berk. & Br. in 19 (2, xiii, 462*, No. 761, 1854); Sacc. iv, 91; 15, 590; 8, 306. On wood, Woolwich.
- **ramosissimum** Berk. & Curt. in 14 (xi, 14, 1882); Sacc. iv, 95; 8, 308; 28 (i, 164); 35 (1912, 90). On wood.
- **repens** Preuss. 19 (3, xviii, 121, No. 1149, 1866); 15, 591; 13, 275; 48 (v, 234); 8, 306; 7, 331; Cooke Exs. 546. On wood.
- **Thwaitesii** Berk. & Br. in 19 (2, vii, 177*, No. 542, 1851); Sacc. iv, 95; 15, 590; 8, 308; 28 (ii, 57); 71 (xliii, 53). On soil and leaves. Melin & Nannfeldt, *Svenska Skogsvardsf. Tidsk.* 1934, p. 457, found it belonged to *Hyphelia*.
- **Thwaitesii** var. **fulvum** Grove in 27 (xxiii, 166, 1885); Sacc. iv, 95; 8, 308. On wood, Warwick.
- Rhopalomyces candidus** Berk. & Br. in 19 (2, vii, 96*, No. 505, 1851); Sacc. iv, 50; 15, 618*; 8, 290; 7, 329; 71 (xxviii, 148). On old hops, etc.—Thaxter, *Bot. Gaz.* xvi, 14, considered *R. pallidus* (q.v.) the same, and an *Oedocephalum*.
- **elegans** Corda. 8, 291, 1893; 33 (xvi, 82). On stems and on dung.
- **pallidus** Berk. & Br. in 19 (2, vii, 96*, No. 504, 1851); Sacc. iv, 50; 15, 618; 46 (ii, 348); 8, 291*; 71 (xxviii, 148); *Oedocephalum* Cost. in 117 (xxiii, 492, 1886). On matting.
- Scopulariopsis brevicaulis** (Sacc.) Bainier. Reported 28 (xix, 146, 1935) as '*S. brevicaule* Link'. In air.
- **communis** Bainier. 27 (xlvi, 154, 1908); 102 (xii, 46); Thom, *The Penicillia*, p. 527. In soil and on stems.
- **Costantini** (Bainier) Dale in 102 (xii, 57, 1914); Thom, p. 528. In soil.
- **penicillioides** (Delacr.) A. L. Smith & Ramsb. in 28 (v, 164, 1915). As *Monilia*: 28 (xvii, 174); 35 (1932, 167). On pupae, etc. See *S. rufulus*.
- **repens** Bainier. 102 (xii, 46, 1914); 116, 109. In soil.
- **rufulus** Bainier. 102 (xii, 45, 1914, reported in error in Vol. x as *Monilia Koningi*); Thom, p. 538. In soil. Miss Dale's culture is referred to *S. penicillioides*, 28 (v, 164).
- Sepedonium chrysospermum** Fr. 20, 350; 15, 619*; 8, 325*; 13, 286; 102 (xii, 48); Ramsbottom, *Handbook Larger British Fungi*, p. 194; Vize Exs. 252. As *Mucor*: 42, t. 398; 55 (iii, 502). *M. argenteus* With. in 38 (Ed. 2, iii, 483, 1792). As *Sepedonium mycophilum* Nees: 39, t. 198; 51, 486; 58 (ii, 209) On Hymenomycetes, chiefly species of *Boletus*; a stage of *Apionectria chrysosperma* (Tul.) Syd.; see 28 (xxi, 275) and 14 (xi, 4*). See *Sporotrichum chrysospermum*.
- **mucorinum** Harz var. **botryoides** Bayliss Elliott in 28 (iv, 294, 1914); Sacc. xxv, 704. On soil.
- **niveum** Massee & Salm. in 33 (xvi, 80*, 1902); Sacc. xviii, 532). On dung of deer, Kew.
- **sepedonioides** (Harz) A. L. Smith in 33 (xxxvi, 181*, 1898). On cardboard, Mon.

- Sepedonium Tulasneanum** Sacc. in *Syll.* iv, 148, named from description and figure 14 (xi, 46*, 1882); 8, 325; 28 (xxi, 276). On *Boletus*, a stage of *Apiocrea Tulasneana* (Plowr.) Petch.
- **xylogenum** Sacc. 68 (1901, 615*); 28 (i, 184*). On a grass seed.
- Sigmoideomyces clathroides** Bayliss Elliott in 28 (iv, 121*, 1909); Sacc. xxv, 653. On soil, Birmingham.
- **divaricatus** McLean in 28 (viii, 246*, 1923). On soil, Wales.
- **Spicaria elegans** (Corda) Harz. 8, 332*, 1893; 35 (1911, 393; 1912, 90). On bark, etc. Thom. *The Penicillia*, considered it a *Paecilomyces*.
- **elegans** var. **muscorum** Grove ex Sacc. in *Syll.* iv, 166, based on Grove 27 (xxiii, 165*, 1885 as *S. elegans*); 8, 332. On moss and wood, Sutton.
- **griseola** Sacc. 34 (xvii, 295*, 1930). In soil, Wales.
- **simplex** Petch in 35 (1936, 60). On *Trichia*, Yorks.
- **'Solani** Reinke & Berth.' teste Wollenw. & Reink. As *Fusarium minutulum* Corda: 19 (4, xv, 34, No. 1457, 1875); 8, 485. On chips, etc.
- **Swantonii** (A. L. Smith) Petch in 35 (1931, 103); 28 (xvii, 175). *Coremium* A. L. Smith in 28 (vi, 156*, 1919); Sacc. xxv, 927; 35 (1932, 133). On insects.
- Sporotrichum aurantiacum** Fr. *S. aurantiacum* Grev. in *Mem. Wern. Nat. Hist. Soc.* i, 70*, 1822 is perhaps the same; see 20, 347; Sacc. iv, 104; 15, 610; 13, 284; 28 (iii, 237); 8, 310; 38 (Ed. 3, iv, 402, 1796) as *Mucor aurantius* Bull.; 120, 551 as *Sporotrichum aureum* Link. On dung, etc. Various kinds of *Amerosporea* have been referred to *Sporotrichum*.
- **carnis** Brooks & Hansford in 28 (viii, 131*, 1923); 28 (ix, 174); 70 (xix, 564); 66 (ccxxv, 99). On meat, etc. This fungus might be referred to Traaen's genus *Geomyces*.
- **chlorinum** Link ex Fr. 20, 346, 1836; 15, 610; 13, 283; 8, 311; 7, 332. On oak leaves, etc.
- **chrysospermum** Harz. 27 (i, 12*, 1912); 28 (vi, 247 and 370). On wood. Some of the records of *Sepedonium chrysospermum*, with which this *Sporotrichum* was at first confused, may belong here.
- **cinnamomeum** Wallr. 108 (ix, 52, 1934). On dry *Phoenix*, Evesham.
- **flavissimum** Link ex Fr. 14 (xvi, 61, 1887); 8, 309; 71 (xxviii, 148); 28 (iv, 20). On wood, etc.
- **geochroum** Desm. ex Fr. 20, 346, 1836; 15, 611; 14 (xiii, 51); 8, 310*; 70 (1936, 410). On wood.
- **Isariae** Petch in 35 (1931, 102); 28 (xvii, 178; xviii, 69). On *Isaria farinosa*. See *I. leprosa*.
- **lacticolor** Cooke & Massee in 14 (xx, 38, 1891); Sacc. x, 532; 7, 331. On bark, Yorks.
- **lanatum** Wallr. 28 (iii, 223, 1910); 35 (1910, 405; 1911, 166; 1915, 48). In polluted water, etc.
- **laxum** Nees ex Fr. 20, 347; 15, 610; 13, 284; 8, 309; 68 (1901, 615); 28 (i, 184); 71 (xxviii, 148); 34 (xvii, 289). *S. minutum* Grev. in *Mem. Wern. Nat. Hist. Soc.* i, 68*, 1822; 39, t. 108; 51, 464. 120, 551, 1821 as *S. candidum* Link. On wood, etc.
- [— **macrosporum** Grev. in 51, 464 was evidently a powdery mildew.]
- **Malorum** Kidd & Beaumont in 28 (x, 111, 1924). In apples. This is evidently not a *Sporotrichum*, but one of the *Gloiosporae*; see 99 (xix, 443).
- **maritimum** Sutherland in 32 (xv, 43*, 1916); Sacc. xxv, 690. On *Laminaria*, Dorset.
- **merdarium** Link ex Fr. 27 (xxiv, 199, 1886); 8, 310. On dog's dung, Hereford.
- **olivaceum** Fr. *Virgaria olivacea* (Link) Gray in 120, 553, 1821. On felled trees.
- **roseum** Link ex Fr. 35 (1913, 175); 67 (cxviii, 154); 102 (xii, 53*); 28 (xix, 146). On paper, etc.
- **sulphureum** Grev. ex Fr. in *Systema*, iii, 423; Grev. in 39, t. 108, 1824; 51, 465; 20, 347; 15, 610*; 13, 284; 8, 310; Berk. Exs. 211; Cooke Exs. ii,

- No. 537; Vize Exs. 343. On bark, etc.—Harz thought it might be the same as *S. flavissimum*.
- [*Sporotrichum tenuissimum* Grev. in *Mem. Wern. Nat. Hist. Soc.* i, 69*, 1822 and 51, 465 was probably only mycelium, teste Berkeley 20, 347.]
- *terricola* Grove in 27 (L, 13*, 1912); Sacc. xxv, 692. On soil, Worcs.
- Stemmaria aeruginosa* Massee in 37 (1913, 199*); Sacc. xxv, 933. On dung, Kew.
- Streptothrix fusca* Corda. 27 (Lxx, 36*, 1932). On stems of *Rubus*, Wales.
- Strumella strobilina* Cooke & Massee in 14 (xviii, 20, 1889); Sacc. x, 733.—On cones, Newcastle.
- Stysanus Clematidis* Fuckel. 14 (xvii, 11, 1888); 8, 459. On *Clematis*.
- *cybosporus* D. Sacc. 27 (L, 46, 1912); 28 (vi, 87). On stems.
- *fimetiarius* (Karst.) Massee & Salm. in 33 (xvi, 86*, 1902); 28 (ii, 34). On dung, etc.
- *Mandlii* Mont. 27 (L, 46, 1912). On twigs, Warwicks.
- *medius* Sacc. 34 (xvii, 295, 1930). In soil, Wales.
- *microsporus* Sacc. 28 (iv, 328, 1914; vi, 53); 70 (xix, 564). On bark, etc.
- *putredinis* Corda. 19 (5, 1, 27, No. 1712, 1878); 13, 281; 48 (ii, 259); 8, 459. On leaves, etc.
- *Stemonitis* (Pers. ex Fr.) Corda. 15, 605*, 1871; 13, 281; 8, 458*; 68 (1901, 615); 28 (i, 184; xix, 147); 7, 346; 66 (cxviii, 7); 33 (xvi, 86); 63 (lxviii, 226); 5, 467; 116, 154; 77 (1931, 149). On leaves, etc. 'Var. *ramosa* Pim': 71 (2, iv, 27); 28 (i, 65). See *Echinobotryum*.
- *Ulmariae* McWeeney in 48 (iv, 277*, 1895). On dying *Spiraea*, Ireland.
- Symphysira parasitica* Massee & Crossland in 35 (1904, 6); Sacc. xviii, 647; 7, 345. On fruits of *Conium* and *Heracleum*, Yorks.
- Torula abbreviata* Corda. 14 (xvi, 97, 1888); 8, 360; 28 (vi, 54). On wood, etc.
- *abbreviata* var. *sphaeriiformis* Berk. & Br. in 19 (2, v, 461, No. 464, 1850); Sacc. iv, 256; 15, 477; 8, 360. On herbs and pine branches.
- *Allii* Harz. 34 (xvii, 296*, 1930). In soil, Wales.
- *antennata* Pers. ex Fr. 8, 361; 7, 337; 28 (xxii, 4; xxiv, 3). *Monilia antenniformis* (Hoffm.) Gray in 120, 557, 1821. On wood. See *Bispora monilioides*.
- *asperula* Sacc. 8, 363, 1893; 48 (xx, 181); 115, 99. On paper, etc.
- *botryoides* Brooks & Hansford [non Corda] in 28 (viii, 134*, 1923). On meat.
- *cylindrica* Berk. in 20, 359, 1836; Sacc. iv, 254; 15, 477; 13, 229; 8, 360. On sticks, Scotland.
- *epizoa* Corda ex Kickx? 28 (v, 243, 1916); 115, 99. On grease. See *Rev. Appl. Mycol.* xix, 402.
- *expansa* Fr. 14 (xvi, 97, 1888); 8, 361; 35 (1908, 285; 1909, 221); 71 (xxviii, 149). On herbs, etc.
- *fusca* (Bon.) Sacc. 28 (vi, 373). *Oospora fusca* (Bon.) Grove in 27 (xxiii, 163*, 1885); 8, 280. On *Bulgaria*, etc.
- *graminis* Desm. 19 (i, 1, 263, No. 134, 1838); 15, 478; 40 (vii, 32); 8, 362; 7, 337; Cooke Exs. ii, No. 629; Vize Exs. 22. On grasses and sedges.
- *gyrosa* Cooke & Massee in 14 (xvi, 10, 1887); Sacc. x, 573; 8, 360. On pine wood, Kew.
- *herbarum* Link ex Fr. 120, 557, 1821; 51, 469; 58 (ii, 210); 15, 478*; 13, 229; 8, 362; 7, 337; 66 (cxviii, 7); Vize Exs. 23 and Fungi Brit. 107; Cooke Exs. 362 and ii, No. 630. On stems, etc.
- [— *lichenicola* Lindsay was transferred by Petrak & Sydow to *Vouauxiella*; see 119, 566 and Grove 1 (ii, 133) as *Sirothecium*. It is apparently a Coelomycete.]
- *lucifuga* Oudem. 34 (xvii, 298*, 1930). In soil, Wales.
- *monilioides* Corda ex Berk. in 20, 359, 1836; 15, 476; 8, 360*; 37 (1897, 423); 7, 336. On wood.
- *nucleata* Cooke in 14 (xvi, 79, 1888); Sacc. x, 574; 8, 362. On herbs.
- *ovalispora* Berk. in 20, 359, 1836; 15, 476; 13, 228; 14 (xvii, 21); 8, 361; 71 (xxviii, 149). *Oospora* Sacc. & Vogl. in *Syll.* iv, 13; 7, 337. On wood.

- [*Torula parasitica* Pim. 71 (xxviii, 149). We have not seen the description of this doubtful, forgotten species.]
- *pulveracea* Corda. 15, 476, 1871; 13, 228; 8, 361; 46 (ii, 214); 7, 336; Cooke Exs. 347 and ii, No. 334; Vize Exs. 117. On wood.
 - *pulvillus* Berk. & Br. in 19 (2, v, 460, No. 463, 1850); Sacc. iv, 252; 15, 476; 8, 359; 71 (xxviii, 149). On oak bark.
 - *rhizophila* Corda. 14 (xvi, 97, 1888); 8, 362. On rhizomes of grasses and sedges.
 - *spongicola* Dufour. 28 (iii, 36, 1908). On a sponge, London.
 - *Tuberculariae* Nees ex Fr. 28 (xxiv, 56, 1940). On *Tubercularia*, Kew.
 - *ulmicola* Rabenh. 14 (iii, 124, 1875); 13, 229; 8, 359. On elm bark.
 - Trichosporium calcigena* (Link ex Fr.) Sacc. 27 (liv, 221, 1916). On walls, Birmingham.
 - *chartaceum* (Pers. ex Fr.) Sacc. 27 (l, 44, 1912); 35 (1913, 175). On paper.
 - *fuscum* (Link ex Wallr.) Sacc. 8, 367*; 7, 337; 120, 551, 1821 as *Sporotrichum*; *Macrotrichum ferrugineum* Grev. in 51, 64, 1824. On bark; a stage of *Rosellinia aquila*.
 - *inosculans* (Berk.) Sacc. in Syll. iv, 293; 8, 367; 7, 337. *Sporotrichum* Berk. in 20, 346, 1836; 15, 610; 13, 284. On *Thelephora* and other fungi.
 - *insigne* Massee & Salmon in 33 (xvi, 85*, 1902); Sacc. xviii, 574. On pigeon's dung, Kew.
 - *murinum* (Link ex Fr.) Sacc. 27 (xxiv, 201, 1886); 8, 367; 7, 337; 34 (xvii, 296*). On wood, etc.
 - *splenicum* Sacc. & Berl. 28 (i, 114, 1900). On wood, Wales.
 - *Tulasnei* Lindau. As *T. umbrinum* (Pers.) Lindau: 14 (xvii, 3, 1888); 8, 366. 'Running over plant pots.' See *Isaria umbrina*, upon which *Trichosporium umbrinum* was originally based.
 - Tuberculina persicina* (Ditm. ex Fr.) Sacc. 10, 299; 9, 204*; 8, 467*; 71 (xxviii, 150). As *Tubercularia*: 18, 341, 1860; 15, 558. On Uredinales.
 - *Sbrozzii* Cav. & Sacc. Common on *Puccinia Vincae*, but apparently recorded in Britain only by Grove 3, 177, 1913, as a possible uredo stage of the rust.
 - *vinosa* Sacc. 9, 204; 8, 467; 71 (xxviii, 150). As *Tubercularia*: 14 (xiii, 52, 1884). On Uredinales.
 - Urophiala parasitica* (Grove) A. L. Smith in 28 (vi, 296, 1920). *Pimina* Grove gen. nov. in 27 (xxvi, 206, 1888); 48 (ii, 259); 28 (i, 65*). On *Botrytis*, on *Passiflora*. See E. W. Mason, *Annotated Acc. List* ii, Fasc. 3, 1941.
 - Verticicladium apicale* (Berk. & Br.) Sacc. in Syll. iv, 328; 8, 386*. *Verticillium* B. & Br. in 19 (2, vii, 101*, No. 531, 1851); 15, 598. On oak, Somerset.
 - *Cheesmanii* Crossland in 35 (1907, 98*); Sacc. xxii, 1361. On wood, Yorks.
 - *trifidum* Preuss. 14 (vi, 23, 1877); 8, 386. On pine leaves, Shrewsbury.
 - Virgaria nigra* Nees ex Sacc. 15, 611*; 13, 284; 8, 374; 39, t. 274, 1823 as *Botrytis*; 20, 346 as *Sporotrichum*. On wood. The citation *V. 'umbrina* Kl.' 14 (xvi, 98) and 8, 358* may refer to the same fungus.
 - Wardomyces anomala* Brooks & Hansford gen. nov. in 28 (viii, 137*, 1923). On meat.
 - Zygodesmus fulvus* Sacc. 27 (l, 7*, 1912; lv, 136). On wood.
 - *fulvus* var. *olivascens* Sacc. 35 (1907, 99). Yorks.
 - *fuscus* Corda. 68A (v, 127*, 1857); 15, 611*; 13, 284; 8, 376; 48 (vii, 288); 66 (cxviii, 7); 7, 338; Vize Exs. 577. On wood.
 - *marginatus* Cooke & Harkn. Recorded with doubt, 40 (ix, 172, 1887). On wood, Scotland.
 - *terrestris* Berk. & Br. in 19 (5, vii, 130, No. 1915, 1881); Sacc. iv, 284; 8, 376*. On chalk, Kent. Massee's figure shows clamp-connexions, and the fungus is probably a *Tomentella*.
 - Zygosporium oscheoides* Mont. 89, 168*. *Cladotrichum Passiflorae* Pim in 31 (xxiv, 724*, 1885), teste Cooke. On *Passiflora*.

XEROSPORAE—DIDYMOSPORAE

- Antromyces Copridis** Fres. 28 (vi, 64, 1918). In dung-case of *Copris* beetle.
- Arthrobotrys oligospora** Fres. 27 (xxii, 198*, 1884; L, 14); 33 (xvi, 83). On dung, etc.—See 100 (xxix, 447) for *Arthrobotrys*.
- **rosea** Massee in 68 (2, v, 758*, 1885); Sacc. iv, 182; 8, 338*; 7, 335; 71 (xxviii, 149). On branches. Matruchot, *Recherches Dévelop. Mucéd.*, 1892, thought it might be the same as *A. oligospora*; see also 100 (xxix, 469).
- **superba** Corda. 33 (xvi, 83*, 1902); 7, 335; 28 (iii, 289; vii, 10). On dung, etc.
- Bispora monilioides** Corda. 18, 327, 1860; 15, 481*; 13, 230; 8, 390*; 7, 339; 66 (cxcviii, 7); 71 (xlii, 54); Cooke Exs. 346 and ii, No. 333. In error as '*Torula antennata*': 39, t. 255, 1827; 20, 359; Berk. Exs. 215; see 18, 327. On wood, especially on the cut ends of oak and beech logs.
- **pusilla** Sacc. 27 (xxii, 199, 1884); 14 (xvii, 80); 37 (1909, 376). On wood, etc.
- Bostrichonema alpestre** Ces. 8, 340*; 7, 335. *Dactylium spirale* Berk. & White in 40 (iv, 162*, 1877); 19 (5, i, 28*, No. 1717). On leaves of *Polygonum*.
- **modestum** (Berk. & White) Sacc. in *Syll.* iv, 185; 8, 341. *Dactylium* Berk. & White in 40 (iv, 162*, 1877); 19, No. 1718*. On *Alchemilla*, Scotland.
- Chlamydomyces Palmarum** (Cooke) Mason in *Annotated Acc. List* ii, Fasc. 1, 37, 1928. One British collection on old elm leaves.
- Cladosporium Algarum** Cooke & Massee in 14 (xvi, 80, 1888); 8, 396; 32 (xv, 37*). Transferred to *Heterosporium* by Cooke & Massee in 14 (xviii, 74, 1890); Sacc. x, 660. On *Laminaria*.—Several of the so-called species of *Cladosporium* included here are probably *C. herbarum*; see 28 (viii, 113).
- **Aphidis** Thüm. 28 (vi, 203, 1919; viii, 123; xvii, 175); 27 (lx, 175); 35 (1932, 168). On aphids; evidently *C. herbarum*.
- **brachormium** Berk. & Br. in 19 (2, vii, 99, No. 515, 1851); Sacc. iv, 363; 15, 584; 8, 394; 7, 430. On *Fumaria*.
- **carpophilum** Thüm. 35 (1920, 403); 31 (3, lxxxix, 151); 85 (xxv, 142); 77 (1928, 118); 79 (v, 30; xi, 52); 65 (xxx, 339); 71 (xlii, 54); 93. On *Prunus domestica*. *C. carpophilum* and *Fusicladium Cerasi* are often considered synonymous, but see 99 (xviii, 313).
- **compactum** Berk. & Curt. 71 (xxviii, 149, 1910). Ireland.
- **cucumerinum** Ellis & Arthur. 22 (Misc. Publ. 33, p. 44); 34 (viii, 13); 80; 112, 337. *C. scabies* Cooke in 56 (1904, p. clxix and clxxi); 89, 102; 5, 475; 23 (xviii, 820). On cucumbers.
- **delectum** Cooke & Ellis. A form recorded 108 (ix, 52, 1934). On *Magnolia*, Worcs.
- **epibryum** Cooke & Massee. 8, 396, 1893. On mosses.
- **epiphyllum** Nees ex Fr. 15, 583; 8, 393; 5, 471*; 5B, 306; 66 (cxcviii, 7); 23 (xiv, 622; xvii, 301); 37 (1899, i; 1914, 190); 102 (x, 468*); 89, 125*; Cooke Exs. 188; Vize Fungi Brit. 179. On leaves, etc., doubtless *C. herbarum*; see 28 (viii, 123).
- **fasciculare** Fr. 15, 583; 8, 395; 35 (1914, 252); 71 (xxviii, 149); Vize Exs. 238. On Monocotyledons.
- **fasciculatum** Corda. 70 (1936, 416). On *Sparganium* and *Scirpus*, Ireland.
- **fulvum** Cooke in 14 (xii, 32, 1883, described from America); 31 (3, ii, 532*, 1887, with suggestion of 'var. *violaceum*'); 8, 393; 56 (xix, 14; xxvi, 725*; xxvii, 817*; xxviii, 142); 23 (v, 192; xviii, 920, etc.); 66 (cxcviii, 7); 5B, 311; 5, 470; 112, 338*; 34 (viii, 13; xvii, 71; xviii, 305; xix, 155; xxiii, 183); 82 (xii, 34); 79 (i-xi); 65 (xxx, 342); 104 (vii, 245); 85 (xxvii, 88; xxxviii, 18); 25 (xxxiii, 217). On *Lycopersicum*.
- **graminum** Corda. 70 (1936, 416); 28 (xxii, 11). On *Phalaris*, *Poa*, and *Carex*, Ireland.
- **herbarum** Link ex Fr. Very many records, including 120, 556; 15, 582*; 8, 394; 28 (viii, 113; x, 112); 57 (v, 36); 33 (xxiv, 359*); 75 (xii, 489); 34

- (xv, 191); **116**, 93; *Poultry Sci.* vi, 251; Cooke Exs. 352 and II, No. 163; *Dematium articulatum* Sow. in **42**, t. 400, 1803. **74** (vi, 44*) as *Hormodendron cladosporioides* (Fres.) Sacc.; **27** (I, 18). On many substances.
- Cladosporium juglandinum** Cooke in **14** (xvi, 80, 1888); Sacc. x, 604; **8**, 394. On fading walnut leaves, Highgate.
- **Kniphofiae** Cooke in **14** (xiv, 40, 1885); Sacc. iv, 367; **8**, 395. On dead leaves of *Kniphofia*, Kew.
- **lignicola** Corda. **19** (2, vii, 100, No. 516, 1851); **15**, 584; **8**, 393; **7**, 340; Vize Exs. 349. On wood.
- **Lycopersici** Plowr. in **31** (xvi, 621*, 1881); **31** (3, II, 409*); **23** (III, 154; v, 192). On tomato fruits; probably *C. herbarum*. See *Alternaria Tomato*.
- **myrmecophilum** (Fres.) Bayliss Elliott in **28** (v, 138*, 1915); Sacc. xxv, 798. In ants' nests, Britain.
- **nodulosum** Corda. **19** (2, vii, 100, No. 517, 1851); **15**, 585; **8**, 394; **71** (xxviii, 149). On stems.
- **orchidearum** Cooke & Massee in **14** (xvi, 80, 1888); Sacc. x, 605; **31** (Oct. 1890*); **8**, 395; **5**, 475; **89**, 172*. On orchids, Kew.
- **Paeoniae** Pass. Vize Exs. 242; **56** (xxvii, 19*, 1902). On *Paeonia*.
- **Pisi** Cug. & Macch. **22** (Misc. Publ. 38, p. 42, 1922). On *Pisum*, Shropshire.
- **punctulatum** Sacc. & Ellis. **70** (1936, 416). On old *Euonymus*, Ireland.
- [— **sphaeroideum** Cooke. Saccardo, *Syll.* iv, 365, erroneously cited this as British, so Massee **8**, 395 included it.]
- **sphaerospermum** Penz. Recorded for Britain in *Syll.* iv, 355, and therefore **8**, 393. On *Citrus*.
- **Typharum** Desm. Vize Exs. 573; **28** (vi, 374, 1920). On *Typha*.
- Cladotrichum fuscum** (Fr.) Sacc. **8**, 398. Fries, *Systema*, III, 426, described *Trichothecium fuscum* and cited as synonym 'Macrotrichum heterosporium Grev. Ed. Phil. Journ. III, t. 1'. Berkeley **20**, 348 could not find this Greville reference. On dead capsules of *Gentiana*.—*Cladotrichum fuscum* Preuss has priority in this genus, but Saccardo renamed it *C. Preussii*.
- **triseptatum** Berk. & Br. in **19** (2, vii, 98*, No. 511, 1851); Sacc. iv, 371; **15**, 581*; **8**, 398. On wood, Northants.
- **uniseptatum** Cooke in **14** (III, 182*, 1875); **73** (1877, t. 25). *C. Cookei* Sacc. in *Syll.* iv, 370; **8**, 398*; **35** (1908, 411). On wood. Saccardo changed Cooke's name [which has priority in *Cladotrichum*] in order to transfer *Virgaria uniseptata* to the genus. See *Scolecotrichum uniseptatum*.
- Dicoccum uniseptatum** (Berk. & Br.) Sacc. in *Syll.* iv, 342; **8**, 389*. *Sporidesmium* B. & Br. in **19** (3, III, 360*, No. 815, 1859); **15**, 485. On *Clematis*, Batheaston.
- Didymaria didyma** (Unger) Schroet. **28** (III, 59); **70** (1936, 412). As *Ramularia*: **14** (xii, 36, 1883); **40** (VIII, 228; x, 67); **8**, 340* as *Didymaria Ungerii* Corda. On *Ranunculus*.
- **Kriegeriana** Bres. **108** (ix, 52, 1934); **28** (xxiii, 238). On *Lychnis*.
- Didymocladium ternatum** (Bon.) Sacc. **28** (I, 114, 1899; II, 137); **27** (I, 15). On *Stereum*.
- Diplocladium macrosporum** (Fr.) Massee in **8**, 335; **7**, 334; **71** (xxviii, 149). As *Dactylium*: **20**, 345, 1836; **15**, 607; **13**, 282; **68A** (1877, 191). On moss, etc.
- **melleum** (Berk. & Br.) Sacc. in *Syll.* iv, 177; **8**, 335*; *Dactylium* B. & Br. in **19** (4, xi, 345*, No. 1382, 1873). On old *Polyporus* and *Stereum*, Batheaston.
- **minus** Bon. **8**, 334, with synonym *D. Renneyi* (B. & Br.) Sacc. in *Syll.* iv, 177. *Dactylium Renneyi* B. & Br. in **19** (4, xi, 346, No. 1383, 1873); **14** (II, 138). On a stump, Hereford.
- **penicillioides** Sacc. in *Syll.* iv, 177, based on Plowright **14** (xi, 44*, 1882) as the unnamed conidial state of *Hypomyces aurantius*; **8**, 334; **28** (xxi, 274). On *Polyporus* and other fungi.
- **tenellum** (Fr.) Massee in **8**, 335, 1893; **28** (iv, 20). As *Dactylium*: **19** (2, vii, 102, No. 536, 1851); **15**, 607; **13**, 281. On moss, Dundee.

- Diplococcium resinae** (Corda) Sacc. 34 (xvii, 291, 1930). In soil. Perhaps Cooke Exs. II, No. 643, as '*Sporotrichum resinae*' on resinous fir.
- **spicatum** Grove gen.nov. in 27 (xxiii, 167*, 1885); Sacc. iv, 374; 8, 399; 27 (I, 44, with correction of diagnosis). On wood.
- Diplospora rosea** Grove gen.nov. in 27 (liv, 220*, 1916); Sacc. xxv, 713. On paper, Scarborough.
- Diplosporium album** Bon. 8, 336*, 1893; 7, 334. On stems.
- **album** var. **fungicola** Sacc. in Syll. iv, 178, based on Plowright 14 (xi, 49*, 1882) as conidia of *Hypomyces violaceus*; 8, 336. On *Fuligo*.
- **cervinum** (Berk. & Br.) Sacc. in Syll. iv, 178; 8, 336. *Dactylium* B. & Br. in 19 (5, I, 28, No. 1716, 1878); 13, 283. On laburnum.
- Endodesmia glauca** Berk. & Br. gen.nov. in 19 (4, vii, 432*, No. 1318, 1871); Sacc. iv, 691; 8, 476*. On cabbage stalks, Batheaston.
- Epochnium monilioides** Link ex Fr. 120, 550, 1821. 'On dried plants and pears.'
- Fusicladium Cerasi** (Rabenh.) Sacc. 5, 469, 1910; 78 (1928, 189); 112, 336; 85 (xxix, 17). On *Prunus Cerasus*. See *Cladosporium carpophilum*.
- **dendriticum** (Wallr.) Fuckel. Very many reports, lately as *Venturia inaequalis*; see 28 (xxiv, 172); 89, 113; 77; 104; 56; 23, etc. Other early records as *Cladosporium* and as *Spilocaea pomi* Fr. On *Pyrus Malus*.
- **depressum** (Berk. & Br.) Sacc. in Fungi Ital. t. 783; 8, 391*; 7, 340; 70 (1936, 416). *Cladosporium* B. & Br. in 19 (2, vii, 99*, No. 514, 1851); 15, 584; 13, 273. On *Angelica*.
- **pirinum** (Lib.) Fuckel. 14 (viii, 111, 1880); 68 (1900, 424*); 23 (xi, 684); 89, 123*; 104 (xi); 77. As *Cladosporium* sp.: 31 (1848, 398); then for some time pear scab was attributed to *C. dendriticum*, e.g. 15, 583. For recent reports as *Venturia* see 28 (xxiv, 172). On *Pyrus communis*.
- **pirinum** var. **Pyracanthae** Thüm. 28 (xxii, 219). As *Cladosporium* sp.: 31 (1848, 716). As *C. orbiculatum* Desm.: 19, No. 513, 1851. As a variety of *C. dendriticum*: 18, 346; 15, 583. As '*Actinonema Crataegi*': 31 (1855, 725). As *Fusicladium Crataegi* Aderh.: 85 (xxxix, 18). As *F. Pyracanthae*: 79 (xiii, 30). On *Crataegus Pyracantha*.
- **saliciperduum** (Allescher & Tubeuf) Tubeuf. 64 (xxxviii, 128, 1924; xxxix, 34); 28 (xi, 163*; xvi, 76); 65 (xxx, 349); 78 (1927, 209); 85 (xxvii, 87); 32 (xxxiv, 64); 93, 225. On *Salix*.
- Gymnodochium fimicola** Massee & Salm. gen.nov. in 33 (xvi, 89*, 1902); Sacc. xviii, 668. On dung of wild sheep, Kew.
- Mycogone alba** Letell. 14 (xvii, 80, 1889); 31 (1893, 299); 89, 108*. On mushrooms. See 28 (xxiv, 197) for *Mycogone* stages with *Hypomyces* names.
- [— **anceps** Sacc. 8, 339. 'Chlamydospores' of *Pilobus*.]
- **cervina** Ditm. ex Chev. 91, 304, 1857; 14 (viii, 104; xi, 51*; xvi, 64); 8, 339*. On *Pezizales*.
- **perniciosa** Magnus. 28 (x, 83*, 1924); 31 (3, lxxxvii, 516*); Ramsbottom, *Handbook Larger British Fungi*, p. 73; 112, 332; 85 (1932-8); 79 (xii, 32); 93, 252. On *Agaricus*. The fungus produces a *Diplocladium* stage, apparently not named.
- **rosea** Link ex Chev. 8, 339; 31 (3, cv, 236); 71 (xxviii, 149). As *Sepedonium*: 20, 351, 1836; 19 (I, I, 263, No. 132); 15, 620; 13, 286; 14 (v, 9; xi, 50*). On *Agaricus*, etc.
- Passalora bacilligera** Mont. & Fr. 8, 390; 89, 216*; 71 (xxviii, 149). As *Cladosporium*: 15, 584, 1871; Cooke Exs. 290. On fading leaves of *Alnus*. See *Centralbl. Bakt.* 2 Abt. LX, 2.
- Polythrincium Trifolii** Kunze ex Fr. 39, t. 216; 20, 338; 15, 582*; 13, 272; 8, 392; 89, 247*; 28 (ix, 218*, life history); 70 (1936, 416); Baxter Exs. 84; Berk. Exs. 97; Cooke Exs. 196 and II, No. 158; *Farinaria* Sow. in 42, t. 396, 1803. On *Trifolium*; stage of *Dothidella* (or *Cymadothea* in 100 (xxvii, 71)).
- Rhynchosporium Secalis** (Oudem.) J. J. Davis. 32 (xxvii, 215*, 1928); 112, 333*; 23 (xxxv, 1095); 79 (v, 24; xi, 44); 1 (II, 281); 27 (lx, 168) as

- Marssonia*; **22** (Misc. Publ. 33, p. 31) as *R. graminicola* Heinsen. On *Secale*, *Hordeum*, *Bromus*, *Dactylis*.
- Scolecotrichum Clavariarum** (Desm.) Sacc. **8**, 392; **5**, 469; **28** (xvi, 15). As *Helminthosporium*: **19** (i, 1, 260, No. 123, 1838); **15**, 573. On *Clavaria*; reputed stage of *Helminthosphaeria*. See *Centralbl. Bakt. Abt. 2*, lx, 6 on *Scolecotrichum*.
- **graminis** Fuckel. **27** (l, 44*, 1912); **23** (xx, 894); **65** (xxx, 344); **71** (xi, 54). On grasses. The species has been transferred to *Passalora* by von Höhnelt and to *Cercospora* by Horsfall in *Mem. Cornell Agr. Exp. Sta.* 130.
- **melophthorum** Prill & Del. Mentioned **56** (xxi, p. clxxxvii, 1898) and **5**, 468. On melons. Von Höhnelt in *Centralbl. Bakt. Abt. 2*, lx, 8 refers it to *Cladosporium cucumerinum*.
- **phomoides** Cooke & Massee in **14** (xvi, 79, 1888); Sacc. x, 600. On dead *Ophiopogon*, Kew.
- **sticticum** (Berk. & Br.) Sacc. in *Syll.* iv, 349; **8**, 391*; **89**, 242*. *Helminthosporium* B. & Br. in **19** (2, xiii, 461*, No. 758, 1854); **15**, 573; Vize Exs. 175. On grasses.
- **uniseptatum** (Berk. & Curt.) Cooke in **14** (xvii, 41, 1888); Sacc. x, 601; **14** (xvii, 53). As *Cladotrichum uniseptatum* (B. & C.) Sacc., non Cooke: Vize Exs. 578. On wood.
- Trichocladium asperum** Harz. **33** (xvi, 85*, 1902); **27** (xli, 259*); **116**, 150. On rabbit dung, roots, etc.
- Trichothecium inaequale** Massee & Salm. in **33** (xvi, 84*, 1902); Sacc. xviii, 539; **27** (xli, 259*). On dung of horse, etc.
- **piriferum** (Fr.) Sacc. **8**, 337; **28** (vi, 87); **71** (xxviii, 149). As *Dactylium*: **20** 345, 1836; **15**, 607. On stems.
- **roseum** Link ex Fr. **120**, 550, 1821; **51**, 465; **39**, t. 172; **20**, 348; **8**, 337*; **27** (l, 14); **28** (vi, 37*; xix, 147); **34** (xxv, 95); **112**, 332; **67** (cvb, 375); **116**; **70** (1929, 314*); Berk. Exs. 99; Cooke Exs. 354 and ii, No. 343. *Dactylium* Berk. in **19**, No. 242; **15**, 608; Vize Exs. 80. As *Cephalothecium*: **28** (x, 111); **66** (ccxxb, 106); **78** (1938, 39). As *C. candidum* Bon.: **8**, 338; **27** (xxxv, 8). As *Trichothecium candidum* Wallr.: **8**, 337; **66** (cxcviii, 7). *T. obovatum* (Berk.) Sacc. in *Syll.* iv, 179; **8**, 337; **71** (xxviii, 149). *Dactylium obovatum* Berk. in **19** (i, vi, 437*, No. 242, 1841); **15**, 608. A common mould.

XEROSPORAE—PHRAGMOSPORAE

- Acrothecium delicatulum** Berk. & Br. in **19** (3, xv, 402*, No. 1055, 1865); Sacc. iv, 485; **15**, 579; **8**, 420; **40** (ix, 172). On wood. See Mason, *Annotated Acc.* List ii, Fasc. 1, on *Acrothecium*.
- **obovatum** Cooke in **14** (v, 50*, 1876); Sacc. iv, 484; **27** (xxiv, 203); **8**, 421. On wood.
- **simplex** Berk. & Br. in **19** (3, vii, 382*, No. 950, 1861); Sacc. iv, 485, with note by Grove; **15**, 579*; **73** (iii, 73*); **8**, 421*. On nettle stems, Batheaston.
- **simplex** var. **elatum** Grove in Sacc., *Syll.* iv, 486; **27** (xxiv, 203, 1886); **8**, 421. On nettle stems, Worcs.
- **tenebrosus** (Preuss) Sacc. **27** (xxiii, 168*, 1885); **8**, 421. On wood, Warwicks.
- **xylogenum** Grove in **27** (xxiv, 203*, 1886); Sacc. x, 662; **8**, 422. On wood, Worcs.
- Arthrobotryum atrum** Berk. & Br. in **19** (3, iii, 361*, No. 822, 1859); Sacc. iv, 629; **15**, 563*; **73** (iii, 73*); **8**, 460*; **46** (iv, 58); **7**, 347; Rabenh. Exs. 65 as '*A. Broomii*'. On herbs.
- **stilboideum** Ces. B. & Br. **19** (3, vii, 381, No. 943, 1861); **15**, 563; **8**, 460; **7**, 347; Rabenh. Exs. 978. On wood.
- Arthrosporium elatum** Massee in **37** (1913, 199*); Sacc. xxv, 929, with suggestion that it is a *Didymostilbe*. On grass, Kew. Spores said to be one-septate.

- Bactridium acutum** Berk. & White in **40** (iv, 162*, 1877); **19** (5, i, 26*, No. 1704, 1878); Sacc. iv, 692; **8**, 477; **13**, 230. On *Peziza*, Scotland.
- **atrovirens** Berk. in **20**, 350, 1836; Sacc. iv, 693; **15**, 480; **8**, 478, 'no specimen'. On wood, Northants.
- **flavum** Kunze ex Fr. Berk. Exs. 327, 1843; **15**, 479*; **8**, 477; **46** (ii, 214); **48** (v, 9); **7**, 348; **71** (xL, 55); Cooke Exs. 542; Vize Exs. 118. On wood.
- **Helvellae** Berk. & Br. in **19** (3, iii, 360*, No. 816, 1859); Sacc. iv, 692; **15**, 479; **8**, 477*. On a *Peziza*, Bathaston.
- Brachycladium botryoides** A. L. Smith in **27** (xLi, 258*, 1903). *Dendryphium* Sacc. in *Syll.* xviii, 593. On germinating grass seeds, Norwood. Miss Smith revived Corda's genus *Brachycladium* for *Dendryphium*-like fungi with conidia not catenulate. Ferraris in 1912 (*Flora Ital. Crypt., Hyphales*, p. 455) independently revived *Brachycladium*.
- **curtum** (Berk. & Br.) A. L. Smith in **27** (xLi, 259, 1903); Ferraris, loc. cit. *Dendryphium* B. & Br. in **19** (2, vii, 176*, No. 538, 1851); Sacc. iv, 489; **15**, 564*; **46** (ii, 215); **8**, 424; **7**, 342; **73** (1873); Cooke Exs. 357 and ii, No. 357. On stems. Miss Smith **28** (vi, 157, as *Dendryphium*) found catenulate spores, 'probably due to the very sheltered laboratory conditions'. This discovery may mean that *Brachycladium* is not tenable.
- **laxum** (Berk. & Br.) A. L. Smith in **27** (xLi, 259, 1903). *Dendryphium* B. & Br. in **19** (2, vii, 176*, No. 539, 1851); Sacc. iv, 490; **15**, 564; **13**, 268; **8**, 424. On stems.
- **penicillatum** Corda. **40** (x, 282, 1890) as *Dendryphium*. On nettle stems, Aberdeen.
- **ramosum** (Cooke) A. L. Smith in **27** (xLi, 259, 1903); Ferraris, loc. cit. *Dendryphium* Cooke in **15**, 464, 1871; Sacc. iv, 489; **73** (iv, 1877, t. 24); **40** (viii, 228); **8**, 424; Cooke Exs. 294 and ii, No. 354. On stems.
- Brachysporium altum** (Preuss) Sacc. **8**, 413. As *Helminthosporium*: **19** (3, vii, 382, No. 948, 1861); **15**, 574. On wood, Twycross.
- **apicale** (Berk. & Br.) Sacc. in *Syll.* iv, 426; **46** (ii, 347); **8**, 413; **7**, 342. *Helminthosporium* B. & Br. in **19** (3, vii, 382*, No. 947, 1861); **15**, 574; **13**, 271; Cooke Exs. ii, No. 355. On wood.
- **biseptatum** Sacc. & Roum. **8**, 414, 1893. On stems.
- **Bloxami** (Cooke) Sacc. in *Syll.* iv, 426; **8**, 413; *Helminthosporium* Cooke in **14** (xii, 36, 1883). On wood, Twycross.
- **ellipticum** (Berk. & Br.) Massee in **8**, 414, 1893. *Monotospora* B. & Br. in **19** (5, vii, 130*, No. 1909, 1881); Sacc. iv, 300. On stems.
- **hyalospermum** (Corda) Sacc. **14** (xvi, 108, 1888); **8**, 413. On wood, Twycross.
- **obovatum** (Berk.) Sacc. in *Syll.* iv, 427; **8**, 414*; **7**, 342. *Helminthosporium* Berk. in **19** (1, vi, 434*, No. 232, 1841); **15**, 573. On wood.
- **oosporum** (Corda) Sacc. **8**, 412; **7**, 342; **28** (vi, 87). As *Helminthosporium*: **19**, No. 944, 1861; **15**, 574*; **40** (ix, 172). On wood.
- **Salisburiae** (Rabenh.) Sacc. **14** (xvi, 108, 1888); **8**, 412. On leaves of *Salisburia*, Kew.
- **stemphylioides** (Corda) Sacc. **40** (ix, 172); **8**, 412; **7**, 342. As *Helminthosporium*: **73** (iv, 5*, 1877); **13**, 271; **27** (xxii, 200); **68** (1885, 758); Cooke Exs. ii, No. 642. On wood.
- **tingens** (Cooke) Sacc. in *Syll.* iv, 427; **8**, 414; **7**, 342; *Helminthosporium* Cooke in **14** (xii, 37, 1883). On wood.
- **Wakefieldiae** Massee in **37** (1913, 198*); Sacc. xxv, 835. On a *Corticium*, Kew.
- Ceratophorum setosum** Kirchn. **56** (lviii, 144*, 1933); **79** (xiii, 29); **22** (Bull. 79, p. 97). On *Lupinus*.
- Cercospora Apii** Fres. **28** (xxii, 11, 1938). Rare on *Apium*; see Brooks, **112**, 343.
- **bacilligera** (Berk. & Br.) Wollenw. in *Fusaria Autog. Del.* No. 450 and **102** (xv, 28, 1917). *Fusisporium* B. & Br. in **19** (2, vii, 178, No. 548, 1851); **15**, 621. *Fusarium* Sacc. in *Syll.* iv, 711; **8**, 483. On *Rhamnus*, 'west of England.'

- Cercospora beticola** Sacc. 37 (1906, 52*); 5, 490; 25 (xxvii, 22); 112, 342; 22, Bull. 79; 93, 41. On *Beta*.
- [— **Bolleana** (Thüm.) Speg. Indefinite reference, 89, 164. On *Ficus*.]
- **Calendulae** Sacc. 35 (1909, 419; 1911, 166). On *Calendula*, Yorks.
- **cantuariensis** Salm. & Wormald in 27 (Lxi, 134, 1923); 23 (xxx, 433*); 28 (xiii, 32*); 112, 343; 77 (1924, 109; 1928–30, 131). On *Humulus*.
- **circumscissa** Sacc. 23 (xiv, 221, 1907; xv, 440; xvii, 211); 5, 483*; 115, 102. On *Prunus*.
- **Comari** Peck. 40 (ix, 172, 1887). On *Potentilla Comarum*, Scotland.
- **concentrica** Cooke & Ellis. 8, 416, 1893. On *Yucca*.
- **dubia** (Riess) Wint. 27 (lvi, 345*, 1918). On *Atriplex*, Worcs.
- **Fabae** Fautr. 78 (1930, 131); 28 (xvii, 195*); 22, Bull. 79; 23 (xlvi, 1047). On *Vicia Faba*.
- **ferruginea** Fuckel. 27 (xxiv, 204, 1886); 8, 416. On *Artemisia*, Worcs.
- **li** Trail in 40 (x, 75, 1889); Sacc. x, 620; 89, 29; 28 (iii, 373). On *Viola*, Scotland.
- **lilacina** Bres. 28 (xxii, 11, 1938). On *Viola*, Ireland.
- **Lythri** (Westend.) Niessl. Recorded 28 (xxii, 11, 1938), Ireland.
- **Melonis** Cooke in 31 (3, xx, 271, 1896) and 23 (ix, 196*, 1902); Sacc. xviii, 598; 5B (Ed. 2, 455); 5, 484; 23 (x, 166; xii, 19; xv, 357; xxix, 469); 89, 101*; 66 (cxcviii, 7); 78 (1914, 141); 79 (v, 29; xi, 48); 85 (xxvii, 88); 112, 342; 31 (3, lxxxvi, 449); 56 (lvii, 63); 22, Bull. 79; *Corynespora Mazei* Gussow gen. nov. in 63 (lxv, 272, 1904). On *Cucumis*.
- **Mercurialis** Pass. 40 (vii, 228, 1886; x, 67); 8, 416; 7, 342. On *Mercurialis*.
- **microsora** Sacc. 40 (x, 67, 1889). On *Tilia*, Scotland.
- **moricola** Cooke in 14 (xii, 30 (British record on p. 37), 1883); Sacc. iv, 475; 8, 416; 89, 139*. On *Morus*.
- **Myrti** Erikss. 28 (vi, 157, 1919). On *Myrtus*, Scotland.
- **Odontoglossi** Prill. & Del. 5, 489, 1910; 82 (xiii, 32). On *Odontoglossum*.
- **Opuli** (Fuckel) von Höhncl. 28 (xi, 18, 1926). On *Viburnum*, Ireland.
- **Resedae** Fuckel. 8, 415*; 5B, 319 and 438; 89, 22*; 5, 489; 70 (1936, 417); Cooke Exs. II, No. 162 (see 14 (iv, 130)). *Virgasperium maculatum* Cooke gen. nov. in 14 (iii, 182, 1875); Sacc. iv, 435; 73 (1877, t. 25). On *Reseda odorata*.
- **Roesleri** (Cattan.) Sacc. 23 (xv, 441, 1908) as *Cladosporium*. On *Vitis*, Blairgowrie.
- **Rubi** Sacc. Recorded 28 (xii, 5, 1927), Arundel. See 5, 489.
- **salina** Sutherland in 32 (xv, 43*, 1916); Sacc. xxv, 895; 28 (v, 432). On sea-weeds.
- **scandicearum** Magnus. 70 (1936, 417). On *Caucalis*, Ireland.
- **Veronicae** A. L. Smith & Ramsb. in 28 (v, 243, 1916); Sacc. xxv, 891. On *Veronica*, Scotland.
- **Violae** Sacc. 56 (xxvii, 28*, 1902); 5B, 319 and 438; 5, 488; 112, 343. On *Viola*.
- [**Cercosporaella Antirrhini** Wakef. in 37 (1918, 233) is a *Pseudodiscosia*; see 28 (xiv, 220) and Grove 1 (ii, 286).]
- **Brassicae** (Fautr. & Roum.) von Höhncl. 79 (xi, 45). E. W. Mason 28 (xx, 110) points out that the type specimen of *Cercospora Bloxami* B. & Br. is *Alternaria Brassicae* (q.v.), but many subsequent records belong to *Cercosporaella Brassicae*. As *Cercospora Bloxami*: 25 (v, 438, 1905); 56 (xxvii, 802); 79 (i, v, ix); 22, Bull. 79. On *Brassica*.
- **Filicis-foeminae** (Bres.) von Höhncl. 28 (xiii, 306, 1928). On *Athyrium*, Scotland.
- **herpotrichoides** Fron. 28 (xx, 120, 1936); 78 (1937, 112); 93, Agric. Prog. xvi, 1. On *Triticum*.
- **Oxalidis** Grove in 27 (lx, 175*, 1922). On *Oxalis*, Surrey.
- **Pastinacae** Karst. 37 (1918, 19*); 112, 335. On *Pastinaca*.
- **Virgaureae** (Thüm.) Allesch. 28 (v, 166, 1915). On *Solidago*, Scotland.

- Clasterosporium abruptum** (Berk. & Br.) Sacc. in *Syll.* iv, 389; **8**, 401; **7**, 341. *Sporidesmium* B. & Br. in **19** (3, xv, 401*, No. 1042, 1865); **15**, 486. On wood.
- **carpophilum** (Lév.) Aderh. **22** (Misc. Publ. 38, p. 82, 1922); **33** (xli, 375*); **112**, 338; **79** (v, vi, ix, xi); **34** (xvii, 297*); **65** (xxx, 339); **22**, Bull. 79. On *Prunus*. See *Helminthosporium rhabdiferum*.
- **caulicola** (Corda) Sacc. **14** (xvi, 107, 1888); **8**, 402. Grove transferred this to *Bactrodesmium* and proposed var. *pellucidum* in **27** (xxiv, 200*, 1886). On stems.
- **claviforme** (Preuss) Sacc. **8**, 402, 1893. On wood.
- **claviforme** var. **leptopus** Sacc. **14** (xvi, 107, 1888); **8**, 402. On wood.
- **fasciculare** (Corda) Sacc. **14** (xvi, 106, 1888); **40** (x, 282); **8**, 401. On wood.
- **fungorum** (Fr.) Sacc. **8**, 401; **7**, 341; **35** (1907, 289). As *Epochnium*: **20**, 352; Berk. Exs. 54. *Sporidesmium* Berk. in **18**, 327; **15**, 865. As '*S. atrum*': **39**, t. 194, 1826; **68** (2, v, 758*). On *Corticium*, etc.
- **maculans** (Corda) Sacc. **40** (x, 282, 1890). On wood, Scotland.
- **opacum** (Corda) Sacc. **8**, 401; **71** (xxviii, 149); **35** (1913, 28). As *Sporidesmium*: **19** (3, xviii, 121*, No. 1145, 1866); **15**, 485. On wood.
- **parasiticum** (Cooke) Sacc. in *Syll.* iv, 392; **8**, 402; **89**, 139*. *Sporidesmium* Cooke in **31** (Nov. 10, 1877, p. 599) and **14** (vi, 74*, Dec. 1877). On leaves of *Morus*.
- **vermiculatum** Cooke in **14** (iv, 69, 1875); **73** (1877, t. 25); Sacc. iv, 384; **8**, 400*. On wood.
- Dactylaria orchidis** Cooke & Massee in **14** (xix, 42, 1890); Sacc. x, 553; **8**, 344. On old *Oncidium*, Kew. See **100** (xxix, 516).
- Dactylella ellipsospora** (Preuss) Grove in **27** (xxiv, 200*, 1886); Sacc. iv, 194; **8**, 343; **28** (vi, 157); **100** (xxix, 492). On wood.
- **implexa** (Berk. & Br.) Sacc. in *Syll.* iv, 194; **8**, 343*; *Dactylium* B. & Br. in **19** (4, xi, 345*, No. 1381, 1873). Inside a willow, Hereford.
- **minuta** Grove gen. nov. in **27** (xxii, 199*, 1884); Sacc. iv, 193; **8**, 342. On wood, Warwicks.
- **minuta** var. **fusiformis** Grove in **27** (xxii, 200*, 1884); Sacc. iv, 194; **8**, 343. On *Carduus*, Warwicks.
- **plumicola** Grove in **27** (liv, 220*, 1916); Sacc. xxv, 723. On feathers, Birmingham.
- **rhombospora** Grove in **27** (xxiii, 166*, 1885); Sacc. iv, 194; **8**, 343. On wood, Birmingham.
- Dactylium dendroides** Fr. **20**, 345, 1836; **73** (1871, t. 4); **15**, 778; **14** (xi, 42*); **8**, 341*; **7**, 335; **71** (xlii, 53); **85** (xxix, 22; xxxi, 16); **28** (xxi, 273). As *Botrytis agaricina* Link: **51**, 468, 1824; **39**, t. 126; **58**, 212. *Verticillium agaricinum* (Bon.) Cooke [non Corda] in **14** (i, 184); **14** (ii, 139*). On agarics and in mushroom beds; stage of *Hypomyces rosellus*.
- **Lycopersici** Plowr. in **31** (2, xvi, 621*, 1881); **89**, 97. On *Lycopersicum*.
- [— **tenuissimum** Berk. was withdrawn in **19**, No. 537.]
- Dendryphium comosum** Wallr. **19** (3, iii, 361, No. 820, 1859); **15**, 563; **8**, 423; **7**, 342; **23** (x, 166*; xi, 153); **89**, 103; **66** (cxcviii, 7); **37** (1911, 377); **48** (xx, 181). On stems and said to be a parasite of *Cucumis*.—See also *Brachycladium*.
- **fumosum** (Corda) Fr. **15**, 565; **73** (1871, t. 5); **8**, 423; *Helminthosporium fumosum* (Corda) Currey in **68A** (1857, 116*). On stems.
- **griseum** Berk. & Br. in **19** (2, vii, 177*, No. 540, 1851); Sacc. iv, 489; **15**, 564; **73** (1873); **8**, 423*. On stems.
- Exosporium hysteroideis** (Corda) von Höhnelt. As *Torula*: **19** (2, xiii, 460, No. 751, 1854); **15**, 477; **13**, 228; Vize Exs. 320. As *Hormiscium*: **8**, 364. On wood. See *Dictyosporium toruloides*.
- **laricinum** Massee in **37** (1907, 242*); Sacc. xxv, 992; **5**, 480; **23** (xx, 1085). As *Exosporium* sp.: **23** (ix, 183*, 1902). On *Larix*, etc.

- Exosporium Tiliae** Link ex Wallr. 39, t. 208, 1826; 8, 491*; 5, 481. As *Helminthosporium*: 20, 337; 19 (i, vi, 434*, No. 230); 15, 572; 13, 270; 71 (xxviii, 149); Cooke Exs. ii, No. 356. On *Tilia*. Massee 8, 407, claimed that *Helminthosporium Tiliae* Fr. is distinct from *Exosporium*.
- Fusariella atrovirens** (Berk.) Sacc. in Syll. iv, 395; 8, 403*; 89, 104*; 5, 497. *Fusisporium* Berk. in 20, 351, 1836; 15, 621; 81, 49. On *Allium*.
- Helminthosporium apiculatum** Corda. 19 (3, vii, 381, No. 945, 1861); 15, 574; 13, 271; 8, 409; 7, 341; Cooke Exs. ii, No. 359; Vize Exs. 66. On wood, etc.
- **Avenae** Eidam. 79 (i, 28, 1924; v, 27; ix, 19; xi); 24 (xiii, 272*; xv, 1 and 406); 87 (viii, 131); 34 (xviii, 535); 28 (xvi, 257; xviii, 223*; xx, 112); 61 (cxxxii, 435); 71 (xl, 55); 47 (5, xlvi, 91); Res. Bull. 3, West of Scotland Agric. College, 1933; 25 (xxxii, 246); 49 (iv, 113); 22, Bull. 79; 78 (1937, 115); 33 (2, ii, 699). On *Avena*; *Pyrenophora* stage recorded 28 (xix, 288).
- **capitulatum** Corda. 14 (xvi, 107, 1888); 8, 405. On wood.
- **cylindricum** Corda. 27 (xxiii, 168, 1885); 8, 405. On wood.
- **delicatulum** Berk. in 19 (i, vi, 435*, No. 233, 1841); Sacc. iv, 410; 15, 573; 13, 270; 8, 407; 46 (iii, 65). *Macrosporium* Cooke in 14 (xvi, 112); 8, 433. On stems.
- **dendroideum** Berk. & Br. in 19 (3, vii, 381*, No. 946, 1861); Sacc. iv, 415; 15, 575; 8, 409; 7, 341. On wood.
- **densum** Sacc. & Roum. 14 (xvi, 108, 1888); 8, 410. On *Morus*, Kew.
- **folliculatum** Corda. 19 (i, vi, 434, No. 231, 1841); 15, 570; 73 (1877, 6); 13, 270; 8, 409; 7, 341; Cooke Exs. 544 and ii, No. 168; Vize Exs. 135. On stems.
- **folliculatum** var. **brevipilum** Corda. 46 (iii, 266*, 1882); 27 (xxii, 200). On wood.
- **fusiforme** Corda. 73 (1877, t. 24); 13, 271; 8, 408*; 28 (i, 164); Vize Exs. 65. On wood.
- **fusisporium** Berk. in 20, 336, 1836; Sacc. iv, 418; 15, 571; 46 (ii, 216); 8, 410. On wood.
- **gongrotrichum** Corda. 14 (xvi, 108, 1888); 8, 409. On wood.
- **gramineum** Rabenh. 28 (i, 151, 1901 and p. 184, 1902); 68 (1901, 615); 5B, 315 and 437; 25 (iii, 18, 1902; xxv, xxviii, xxix, xxx); 23 (xii, xiv); 69 (i, 367); 22 (Misc. Publ. 38); *Proc. Cambridge Phil. Soc.* (Biol. Sci.), i, 132; 79 (i, iii-v, x, xi); 85 (xxiv, 149); 28 (xvi, 256); 78 (1937, 117); 34 (xvi, 236). On *Hordeum*. See 110 (xxiv, 641).
- **Gymnostachyi** Pim in 71 (1884, 285); 71 (xxviii, 149). On *Gymnostachyum*, Ireland.
- **hirudo** Sacc. var. **anglicum** Grove in 27 (xxiv, 202*, 1886). On wood, Warwicks. This variety and the next were entered in Syll. iv, 383 (Apr. 1886) and 8, 400 under *Clasterosporium*.
- **hirudo** var. **minus** Grove, loc. cit. On wood, Warwicks. Grove considered *H. obclavatum* a younger state.
- **hormiscioides** (Corda) Sacc. 27 (xxiv, 202, 1886); 8, 400 as *Clasterosporium*. On wood, Warwicks.
- **inconspicuum** Cooke & Ellis. 27 (i, 44*, 1912). On grass leaves, Staffs. The name is a synonym of *H. turcicum* Pass. teste Drechsler 110 (xxiv, 641).
- **inconspicuum** var. **britannicum** Grove in 27 (xxiii, 168, 1885); Sacc. iv, 412; 8, 408. On grass leaves, Warwicks.
- [— **interseminatum** Berk. & Rav. Recorded 102 (x, 469*), but E. W. Mason, *Annotated Acc. List* ii, Fasc. i, p. 5, considered it an *Acrothecium*. See *Dendryphiella* in 102 (xii, 417).]
- **macilentum** Cooke in 14 (vi, 74*, 1877); Sacc. iv, 418; 8, 411. On wood.
- [— **macrocarpum** Grev. ex Fr. in *Systema* iii, 356; 39, t. 148, 1825; Sacc. iv, 412; 20, 336; 15, 571; 73 (1877, 6); 13, 270; 8, 408; 7, 341; 71 (xl, 55); Vize Fungi Brit. 177; Cooke Exs. 543 and ii, No. 358. *Sphaeria ciliaris* Sow. in 42, t. 339, 1801. On wood. As Tulasne 114 (ii, 277) noted, *H. macrocarpum* is a synonym of *H. velutinum*, q.v.]

- Helminthosporium microsorum** D. Sacc. 27 (LXXVI, 359, 1938). On *Quercus Ilex*, Cornwall.
- **minimum** Cooke in 14 (xvi, 80, 1888); Sacc. x, 613; 8, 406. On wood, Hereford.
- **molle** Berk. & Curt. 19 (5, vii, 130, No. 1910, 1881); 14 (x, 49); 8, 406; 71 (xxviii, 149). On branches.
- **nanum** Nees ex Fr. 120, 556, 1821; 20, 336; 15, 572; 40 (v, vi, viii); 8, 407. On wood, etc.
- **obclavatum** Sacc. 27 (xxii, 200*, 1884; xxiv, 202); 28 (i, 194); 8, 410. On wood. See *H. hirudo*.
- **parvum** Grove in 27 (xxiv, 203*, 1886); Sacc. x, 610; 14 (xvi, 108); 8, 406. On wood, etc.
- **resinaceum** Cooke in 14 (xvii, 68, 1889); Sacc. x, 610. On pine resin, Shere.
- **reticulatum** Cooke in 15, 576, 1871; Sacc. x, 610; 14 (xvi, 108; xvii, 68); Cooke Exs. 360. On dead ash leaves.
- [— **rhabdiferum** (Berk.) Berk. apud B. & Br. in 19 (3, xv, 402, No. 1053, 1865); Sacc. iv, 419; 15, 575; 8, 411; 56 (xxxiii, 527); 89, 134*; *Macrosporium* Berk. in 31 (1864, 938*). On ripe peaches. Lindau, Lind, and others consider it a synonym of *Clasterosporium carpophilum*.]
- **rhopaloides** Fres. 14 (v, 58, 1876); 73 (1877, t. 24); 27 (xxii, 200); 8, 411; 7, 341; 28 (iii, 148); Cooke Exs. ii, No. 448; Vize Exs. 68. On stems.
- **Rousselianum** Mont. 19 (2, vii, 98, No. 508 bis, 1851); 15, 572; 73 (1877, 73); 13, 270; 8, 407. On wood.
- **sativum** Pammel, King & Bakke. *Proc. Camb. Phil. Soc.* (Biol. Sci.), i, 1924; 28 (xvi, 253*); 22, Bull. 79. Causes foot-rot of *Triticum* and *Hordeum*.
- **scoleoides** Corda. 19 (3, xv, 402, No. 1052, 1865); 15, 574; 8, 409. On stems, etc.
- **simplex** Kunze ex Fr. 20, 337, 1836; 15, 572; 8, 405; 71 (2, iv, 27). On wood.
- **Smithii** Berk. & Br. in 19 (2, vii, 97*, No. 507, 1851); Sacc. iv, 416; 68A (v, 115*); 73 (ii, t. 7); 15, 570; 13, 269; 8, 410; 7, 341; Vize Exs. 136; Cooke Exs. 361 and ii, No. 357. On *Ilex*, etc.
- **subulatum** Nees ex Fr. 20, 336, 1836; 15, 571; 13, 270; 8, 407; 46 (iii, 65). On oak branches.
- **teres** Sacc. 23 (xiv, 356, 1907); 5, 482; 24 (v, 415); 65 (xxx, 344); 34 (xvi); 85 (xxviii, 49; xxix, 16; xxxi, 13); 25 (xxxii, 73); 78 (1937, 117). On *Hordeum*. Some of the records are as *Pyrenophora*, but perithecia are apparently unknown in Britain.
- [— **Tiliae** Fr. See *Exosporium*.]
- **turbinatum** Berk. & Br. in 19 (2, vii, 98*, No. 508, 1851); Sacc. iv, 418; 15, 572; 46 (ii, 347); 8, 411. On wood.
- **velatum** Corda. 14 (xvi, 108, 1888); 8, 411. On wood.
- **velutinum** Link ex Fr. 120, 557, 1821; 39, t. 148; 20, 336; 15, 571; 13, 270; 8, 405; 7, 341; Cooke Exs. 358 and ii, No. 358. On wood; the type species of *Helminthosporium*. The spores are multi-septate, not three-septate as stated by Saccardo. See *H. macrocarpum*.
- **Warpuriae** Wakef. in 37 (1918, 233); Sacc. xxv, 818. On *Warpuria*, Kew.
- Heterosporium Allii** Ellis & Martin var. **cepivorum** Nicolas & Aggéry. 85 (xxix, 17, 1932); 22, Bull. 79. On *Allium*.
- **Auriculae** Cooke in 56 (xxvii, 380*, 1902); Sacc. xviii, 1384; 5, 498; 112, 339; nom. nud. 14 (xvi, 109, 1888). On *Auricula*.
- **echinulatum** (Berk.) Cooke in 14 (v, 123, 1877); Sacc. iv, 481; 73 (1877, 9); 8, 417; 5B, 319*; 56 (xxvi, 650 and p. cxxx; xxvii, 34*); 5, 497*; 23 (xx, 799; xliii, 1047); 79 (iv, v, vii, viii, xi); 71 (xlii, 54); 85 (xxxiii, 21); 22, Bull. 79; 112, 339; *Helminthosporium* Berk. in 31 (1870, 382*); 15, 575; 31 (xxvi, 244*); Cooke Exs. ii, No. 360; Vize Exs. 67. *Helminthosporium exasperatum* B. & Br. in 19 (4, xi, 345*, No. 1380, 1873); Sacc. iv, 407 and 481; 14 (ii, 138; v, 123); 56 (xv, p. xlii); 8, 406; *Heterosporium exasperatum* (B. & Br.)

- Cooke in **14** (xvi, 109). On *Dianthus*, stage of *Didymellina Dianthi* C. C. Burt in **28** (xx, 214). Cooke at first (**14** (v, 123)) stated that the epithets *echinulatum* and *exasperatum* referred to the same fungus, then **14** (xvi, 109; xvii, 21) stated that *Heterosporium echinulatum* grows upon Monocotyledons. In **89**, 35, he went back to the correct view. Meanwhile Massee **8**, listed *Helminthosporium exasperatum* on p. 406 on *Dianthus* and *Silene*, and on p. 418 as a synonym of *Heterosporium Ornithogali* on Monocotyledons; the '*H. asperatum* (Berk.) Massee' in **68** (1892, 577*) and Sacc. xxii, 1388 is one more exasperating reference, this time evidently to *H. Ornithogali* (there is no specimen in Herb. Kew. marked '*H. asperatum*'). Finally Massee **37** (Add. ser. v, 180, 1906) listed '*H. echinulatum*' on *Convallaria*; see **22** (Bull. 117, p. 59). See *H. Ornithogali* and *H. variabile*.
- Heterosporium epimyces** Cooke & Massee in **14** (xvi, 80, 1888); Sacc. x, 660; **8**, 419; **7**, 342; **28** (iii, 17). On *Boletus*, etc.
- **gracile** Sacc. **31** (3, xv, 718, 1894); **56** (xxvi, 450; xxvii, 398*); **27** (L, 45*); **56** (xl, 481*); **23** (xxii, 363; xxxii, 546); **62** (viii, 205); **79** (iv–xii); **65** (xxx, 346); **71** (xlii, 54); (**22** Bull. 117). On *Iris*. The fungus was said to occur also on *Freesia*, *Antholyza* and *Hemerocallis*, e.g. **5B**, 321; **56** (xxvi); **5**, 499, and on *Narcissus* **56** (xxviii, 679).
- **Laricis** Cooke & Massee in **14** (xvi, 80, 1888); Sacc. x, 658; **8**, 418. On fading leaves of *Larix*, Norfolk.
- [— **maculatum** Kl. ex Cooke in **14** (xvii, 65, 1889). This was based on Klotzsch Exs., Herb. Myc. 67, from the continent. There is no other specimen at Kew.]
- **Magnusianum** Jaap. **70** (1936, 70); **28** (xxii, 11). On *Narthecium*, Ireland.
- **minutulum** Cooke & Massee in **14** (xvi, 11, 1887); Sacc. x, 659; **8**, 418; **89**, 175*. On *Chamaerops*, Kew; recorded **23** (ii, 441) on *Humulus*.
- **Ornithogali** Kl. ex Cooke gen.nov. in **14** (v, 123, 1877); Sacc. iv, 480; **73** (1877, 8*); **8**, 418; **31** (3, i, 840; iii, 658); **89**, 67*; **22** (Bull. 117); Vize Exs. 70. On *Ornithogalum*. See other references under *H. echinulatum*.
- **Syringae** Klebahn. Massee **37** (1911, 82*) as *Helminthosporium* [comb.nov.?]. On *Syringa*. There is an earlier *Heterosporium Syringae* Oudem.; see **5**, 568; it was reported **79** (xv, 39).
- **Typharum** Cooke & Massee in **14** (xvi, 80, 1888); Sacc. x, 660; **8**, 419*. On *Typha*, Kew. Cooke **14** (xvi, 109) listed it and also '*Heterosporium Phragmitis* var. *Typharum*'. The single specimen in Kew Herb., coll. Kew, 1887, still bears the latter nomen nudum; no specimen is marked *H. Typharum*.
- **variabile** Cooke in **14** (v, 123, 1877); Sacc. iv, 480; **73** (1877, i. 25); **8**, 417; **89**, 99*; **5**, 499; **93**; **31** (3, cvi, 100). For a time this was thought to be a synonym of *H. echinulatum*; see **14** (iv, 130; v, 43); **31** (xxvi, 244). The fungus was first issued as *Helminthosporium variabile*, nomen nudum, in Cooke Exs. 360. On *Spinacia*.
- Isariopsis Acanthacearum** Cooke in **14** (xix, 8, 1890); Sacc. x, 700. On leaves of *Erianthemum* and *Daedalacanthus*.
- **alborosella** (Desm.) Sacc. **40** (ix, 41, 1887; x, 76); **108** (ix, 52); **70** (1936, 417). On *Cerastium*.
- **carnea** Oudem. **40** (ix, 41, 1887; x, 68). On *Lathyrus*, Scotland.
- **Stellariae** Trail in **40** (x, 76, 1889); Sacc. x, 700. On *Stellaria*, Scotland. Conidia said to be continuous.
- Mucrosporium sphaerocephalum** (Berk.) Sacc. in *Syll.* iv, 190; **8**, 342*; **27** (xxxv, 8); **7**, 335; **28** (ii, 47). *Dactylium* Berk. in **19** (i, vi, 437*, No. 243, 1841); **15**, 607*. On twigs, etc.
- Napicladium arundinaceum** (Corda) Sacc. **8**, 419*; **28** (xxi, 221). As *Helminthosporium*: **14** (ii, 186, 1874); Vize Fungi Brit. 176; Cooke Exs. 646 and ii, No. 157. On *Phragmites*.
- **Brunaudii** Sacc. **71** (xxviii, 149, 1910). Ireland.
- Paraspora triseptata** Grove gen.nov. in **27** (xxii, 196*, 1884); Sacc. iv, 222; **8**, 347. On wood, Sutton.

- Ramularia acris** Lindr. 28 (vi, 374, 1920; vii, 10). On *Ranunculus*.
 — **Adoxae** (Rabenh.) Karst. 14 (xiv, 132, 1886); 40 (ix, 172). On *Adoxa*, Scotland.
 — **agrestis** Sacc. 40 (ix, 41, 1887). On *Viola*, Scotland.
 — **Ajugae** (Niessl) Sacc. 40 (ix, 172, 1887); 28 (iii, 121; iv, 37; v, 363); 70 (1936, 414). On *Ajuga*.
 — **Alismatis** Fautr. 70 (1936, 412). On *Alisma*, Ireland.
 — **alnicola** Cooke in 14 (xiv, 40, 1885); Sacc. iv, 199; Rabenh. *Krypt.-Fl.* 8, 438; transferred to *Ovularia* by Massee in 8, 322. On *Alnus*.
 — **Angelicae** von Höhnelt. 28 (v, 167, 1915). On *Angelica*, Arran.
 — **Anthrisci** von Höhnelt. 28 (v, 3, 1915); 70 (1936, 414). On *Anthriscus*.
 — **Arenariae** A. L. Smith & Ramsb. in 28 (iv, 327, 1914); Sacc. xxv, 726. On *Arenaria*, Scotland.
 — **Ari** Fautr. 27 (liv, 221, 1916); 28 (xxiii, 238). On *Arum*.
 — **Armoraciae** Fockel. 14 (ii, 186, 1874; iii, 65); 89, 85*; 77 (1926-7, 86); Cooke Exs. 638 and ii, No. 170; Vize Exs. 346. *Ovularia* Massee in 8, 321; 7, 333. On *Cochlearia Armoracia*.
 — **aromatica** (Sacc.) von Höhnelt. 28 (iii, 369, 1912). On *Acorus*, Scotland.
 — **arvensis** Sacc. 28 (v, 242, 1916; xxi, 4). On *Potentilla*.
 — **Asteris** (Phill. & Plowr.) Bubák in 102 (vi, 27, 1908); *Fusidium* Phill. & Plowr. in 14 (vi, 23, 1877). On *Aster*, Norfolk. Perhaps the same as *R. macrospora* var. *Asteris*, 65 (xxx, 345).
 — **Barbareae** Peck. 28 (vi, 134, 1919); 70 (1936, 413). On *Barbarea*.
 — **beticola** Fautr. & Lamb. 77 (1926-7, 86, 1928); 22 (Bull. 70, etc.). On *Beta*.
 — **brunnea** Peck. 28 (vi, 372, 1920). On *Tussilago*, Surrey.
 — **calcea** (Desm.) Ces. 40 (vii, 37, 1883; x, 67); 27 (xxiv, 199); 8, 346; 7, 336; 70 (1936, 414). On *Nepeta*.
 — **Calthae** (Erikss.) Lindr. 28 (vii, 224); 35 (1934, 138); 70 (1936, 413). *Cercospora Calthae* Cooke in 14 (xi, 72, 1882) was referred by its author (ibid. p. 155) to *Cylindrosporium niveum* B. & Br. Later 14 (xvii, 19) Cooke revived his *Cercospora Calthae*; Sacc. x, 618; 8, 415; 35 (1914, 382). *Cylindrosporium niveum* B. & Br. in 19 (4, xv, 34, No. 1459, 1875); Sacc. iii, 737; see Grove 1 (ii, 297). As '*Ramularia nivea*' in error: 35 (1914, 16 and 147). On *Caltha*.
 — **Campanulae-latifoliae** Allesch. 28 (v, 242, 1916). On *Campanula*, Scotland.
 — **Cardamines** Syd. 28 (v, 167, 1915). On *Cardamine*, Scotland.
 — **Cardui** Karst. 28 (v, 242, 1916; v, 363 and 431). On *Carduus* and *Cirsium*, Scotland.
 — **Centaureae** Lindr. 28 (iii, 369, 1912); 70 (1936, 415). On *Centaurea*.
 — **Centranthi** Brun. 70 (1936, 415). On *Centranthus*, Ireland.
 — **Circaeae** Allesch. Recorded 28 (xxii, 11, 1938), Ireland.
 — **Cirsii** Allesch. 28 (vi, 372, 1920; vii, 10; xi, 18). On *Cirsium*.
 — **Cochleariae** Cooke in 14 (xi, 155, 1883); Sacc. iv, 201; 40 (vii, 85); *Ovularia* Massee in 8, 322. On *Cochlearia*, Scotland.
 — **Coleosporii** Sacc. Recorded 28 (xxi, 4, 1937), Dovedale.
 — **Cryptostegiae** Pim in 14 (viii, 150, 1880); Sacc. iv, 215; 27 (xviii, 345); 8, 346. On decaying seeds of *Cryptostegia*, Ireland.
 — **Cupulariae** Pass. As *Ovularia Inulae* Sacc.: 70 (1936, 412). On *Pulicaria*, Ireland.
 — **Doronici** (Sacc.) Grove in 27 (lx, 175, 1922). As *Ovularia*: 14 (xiv, 132, 1886); 28 (iii, 368; vi, 156). On *Doronicum*.
 — **Epilobii** Allesch. 28 (xi, 18, 1926); 70 (1936, 413). On *Epilobium*, Ireland. Allescher also wrote the epithet '*Epilobii-palustris*'.
 — **eximia** Bubák. 28 (iv, 174, 1913). On *Crepis*, Scotland.
 — **filaris** Fres. var. **Lappae** Bres. Recorded 28 (xi, 18, 1923; xxii, 11; xxiii, 238). On *Arctium*.
 — **Gei** (Fockel) Lindau. 28 (xxi, 4; xxii, 219); 40 (x, 282, 1890) as *Acrotheca*. On *Geum*.
 — **Geranii** Fockel. 8, 345; 56 (xxvii, 40); 7, 336; 28 (iii, 369); 70 (1936, 413); Vize Exs. 75. As *Fusidium Geranii* Westend.: 14 (iii, 77, 1874; iii, 184); 40 (vii,

- 85); Cooke Exs. 685. On *Geranium*.—Saccardo and others erroneously cite the name as *R. Geranii* (Westend.) Fuckel. Westendorp's epithet is earlier, but Fuckel described his *Ramularia* as a new species, not as a new combination.
- Ramularia Hellebori** Fuckel. 14 (xiii, 51, 1884); 8, 344*; 7, 336; 89, 11*. On *Helleborus*.
- **Heraclei** (Oudem.) Sacc. 40 (vii, 272, 1884; viii, 228); 28 (iii, 369; iv, 37); 70 (1936, 414). On *Heracleum*.
- **Hypochoeridis** Magnus. 28 (vi, 371, 1920; vii, 10); 71 (xlii, 54). On *Hypochoeris*.
- [— **inconspicua** Trail, 40 (ix, 172), nomen nudum.]
- **Keithii** Massee nom.nov. in 8, 345, 1893, based on *R. Malvae* Fuckel var. *Malvae-moschatae* Sacc. in Syll. iv, 205; 28 (iv, 70). As *R. Malvae*: 14 (xi, 72, 1882); 40 (vii, 36). On *Malva moschata*, Scotland.
- **Knautiae** (Massal.) Bubák. 28 (iii, 370, 1912; iv, 37; v, 17); 108 (ix, 52). On *Knautia*.
- **Kriegeriana** Bres. Recorded 28 (xxii, 11, 1938). Ireland.
- **lactea** (Desm.) Sacc. 14 (xvi, 65); 89, 27*; 79 (v, 31); 71 (xlii, 53). As *R. Violae* Fuckel: 14 (iv, 109, 1876); Vize Exs. 341. *Ramularia Violae* Trail in 40 (x, 74, 1889) is a later homonym and probably a synonym of *R. Violae* Fuckel; see 28 (iv, 74; v, 431); 35 (1915, 101). As *Ovularia lactea* (Desm.) Bomm. & Rouss.: 8, 321; 63 (lxi, 735). On *Viola*.
- **lamiicola** Massal. 28 (iii, 370, 1912). On *Lamium*, Scotland.
- **Lampsanae** (Desm.) Sacc. 14 (xiv, 40); 40 (ix, 41; x, 67); 27 (xxiii, 166); 8, 345; 71 (xlii, 54). *Ovularia* Massee in 8, 320; 7, 333. As *Fusidium cylindricum* Corda: 14 (iv, 120, 1876). On *Lapsana* (*Lampsana*).
- **lychnicola** Cooke in 14 (xiv, 40, 1885); Sacc. iv, 204; 56 (xxvi, 650*; xxvii, 35); 28 (iv, 182). *Ovularia* Massee in 8, 320; 7, 333. On *Lychnis*.
- **Lysimachiarum** Lindr. 28 (vi, 156, 1919); 108 (ix, 52). On *Lysimachia*.
- **macrospora** Fres. 40 (ix, 41, 1887); 28 (iii, 370); 56 (xxxvii, 543); 71 (xlii, 53); 79 (vi, viii, xiii); 85 (xxvi, 165; xxxiii, 21); 27 (lxxvi, 359). On *Campanula*.
- **macrospora** var. **Senecionis** Sacc. 70 (1936, 415). On *Senecio*, Ireland.
- **menthicola** Sacc. 71 (xlii, 53, 1934). On *Mentha*. *R. menthicola* Trail in 40 (viii, 228, 1886) is a nomen nudum.
- **necator** Massee in 37 (1907, 243*); Sacc. xviii, 1314; 5, 476. On cotyledons of *Theobroma*, Kew; seeds from Jamaica.
- **Nymphaearum** (Allesch.) Ramsb. in 28 (v, 166, 1915); comb.nov. suggested but not made in 56 (xl, p. cxv, 1914). As *Ovularia*: 22 (Bull. 79, p. 94). On *Nymphaea* and *Nuphar*.
- **obducens** Thüm. 70 (1936, 414); 40 (ix, 172, 1887, in error as *R. obducens* 'Peck'). On *Pedicularis*.
- **Parietariae** Pass. 40 (x, 282, 1890); 70 (1936, 412). On *Parietaria*.
- **Pastinacae** Bubák. 37 (1918, 18*). On *Pastinaca*.
- **Petuniae** Cooke in 14 (xx, 8, 1891); Sacc. x, 561; 89, 61*. On *Petunia*, Plymouth.
- **Picridis** Fautr. & Roum. 108 (ix, 52, 1934). On *Picris*, Evesham.
- **plantaginea** Sacc. & Berl. 40 (ix, 41, 1887); 28 (iii, 371; iv, 208; xi, 18); 35 (1914, 147); 62 (xxi, 287); 27 (lxxvi, 359). On *Plantago*. Grove 1 (ii, 297) refers here *Cylindrosporium rhabdosporum* B. & Br. in 19 (4, xv, 34, No. 1458, 1875).
- **Plantaginis** Ellis & Martin. 40 (ix, 41, 1887; x, 67); 28 (iii, 371; iv, 37 and 220). On *Plantago major*.
- **pratensis** Sacc. 14 (xiii, 51, 1884); 40 (viii, 228; x, 67); 8, 347; 35 (1914, 147); 70 (1936, 413). On *Rumex*. Trail recorded a 'variety', 40 (ix, 172).
- **Primulae** Thüm. 56 (xiii, p. clxxvii, 1891; xxvii, 379*); 27 (l, 15*); 35 (1914, 147); 71 (xlii, 54). On *Primula*.
- **pruinosa** Speg. 14 (xi, 15, 1882); 40 (vii, 36; x, 67); 8, 346; 71 (xlii, 54). On *Senecio*.

- Ramularia punctiformis** (Schlecht.) von Höhnelt. **70** (1936, 414). *R. Epilobii* (Schneid.) Trail in **40** (x, 67 and 74, 1889; x, 282). As *R. montana* Speg.: **40** (ix, 41, 1887); **28** (iii, 371). On *Epilobium*. See **102** (vi, 214).
- **purpurascens** Wint. **70** (1936, 415); **28** (xxi, 4); **27** (Lxxvi, 359). On *Petasites*.
- **Ranunculi** Peck. **70** (1936, 413); **28** (xxii, 4). On *Ranunculus*.
- **Rapae** Pim in **27** (xxxv, 58, 1897); Sacc. xiv, 1059; **28** (i, 66). On *Brassica Rapa*, Ireland.
- **Rhei** Allesch. **93**, 112; **115**, 98; **28** (xxii, 11). On *Rheum*.
- **rosea** (Fuckel) Sacc. **14** (xiii, 51, 1884); *Ovularia* Massee in **8**, 323. On *Salix*, Norfolk.
- **sambucina** Sacc. **40** (x, 282, 1890); **28** (iii, 372); **27** (liv, 221); **71** (xlii, 53); **108** (ix, 52). On *Sambucus*.
- **Saxifragae** Syd. **70** (1936, 413). On *Saxifraga*, Ireland.
- **sclerata** Cooke in **14** (xiv, 40, 1885); Sacc. iv, 200; *Ovularia* Massee in **8**, 323. On *Ranunculus*, Hants.
- **Schulzeri** Bäumli. **28** (v, 167, 1915). On *Lotus*, Scotland.
- **Scolopendrii** Fautr. **70** (1936, 412); **28** (xxi, 4). On *Phyllitis*.
- **Scrophulariae** Fautr. & Roum. **28** (iii, 372, 1912); **27** (lvi, 344); **70** (1936, 414). On *Scrophularia*.
- **Senecionis** (Berk. & Br.) Sacc. in *Syll.* iv, 210; **28** (iii, 371). *Cylindrosporium* B. & Br. in **19** (4, xvii, 142, No. 1613, 1876); **1** (ii, 198). *Ovularia* Massee in **8**, 321. On *Senecio*, Scotland.
- **Spiraeae** Peck. Recorded **28** (xxi, 4, 1937; xxii, 4 and 11).
- **Stachydii** (Pass.) Massal. Recorded **28** (xxi, 4, 1937 and xxii, 219).
- **Succisae** Sacc. **40** (x, 41, 1887); **70** (1936, 415). On *Scabiosa Succisa*.
- **Tanacetii** Lind. **28** (vi, 372, 1920). On *Tanacetum*, Surrey.
- **Taraxaci** Karst. **40** (ix, 41, 1887); **27** (l, 15*); **28** (iii, 372); **71** (xlii, 54). On *Taraxacum*.
- **Tulasnei** Sacc. **5B**, 107*, 1899; **89**, 149*; **23** (xvii, 476); **77** (1936, 190). On *Fragaria*, stage of *Mycosphaerella Fragariae*.
- **Ulmariae** Cooke in **14** (iv, 109, 1876); Sacc. iv, 204; **40** (x, 67); **8**, 345; **70** (1936, 413); Vize Exs. 75. On *Spiraea Ulmaria*.
- **umbrosa** A. L. Smith & Ramsb. in **28** (vi, 52, 1918); Sacc. xxv, 737. On *Saxifraga umbrosa*, Scotland.
- **Urticae** Ces. **40** (viii, 228, 1886; x, 67); **8**, 347; **7**, 336; **70** (1936, 412); **71** (xlii, 53). On *Urtica*.
- **Valerianae** (Speg.) Sacc. **40** (viii, 228, 1886); **27** (xxxvi, 182); **28** (iv, 37); **71** (xlii, 53). On *Valeriana*.
- **vallisumbrosae** Cav. **79** (1924-38); **71** (xlii, 53); **65** (xxx, 347); **23** (xliii, 865); **85** (xxxix, 20); **28** (xxiii, 24*); **22** (Bull. 117). *R. Narcissi* Chittenden in **31** (3, xxxix, 277, 1906); **56** (xxxvii, 544). As *Cercospora Narcissi* Boud.: **84** (iii, 186); **22** (Bull. 79, p. 108). On *Narcissus*.
- **variabilis** Fuckel. **14** (iv, 120, 1876); **40** (viii, 228; x, 67); **8**, 346; **70** (1936, 414). On *Digitalis*.
- **Winteri** Thüm. **28** (iii, 283, 1911; iv, 37); **70** (1936, 413). On *Ononis*.
- Septocylindrium chaetospora** Grove in Sacc., *Syll.* iv, 224 and in **27** (xxiv, 199*, 1886); **8**, 349. On wood, Staffs.
- **concentricum** (Berk. & Br.) Sacc. in *Syll.* iv, 225; **8**, 349; **7**, 336. *Septonema* B. & Br. in Rabenh. Fungi Eur. Exs. No. 777; **15**, 482. On chips, etc.
- **elongatisporum** (Preuss) Sacc. **8**, 349; **71** (xxviii, 149). As *Septonema*: **19** (3, xv, 403, No. 1059, 1865); **15**, 482; **40** (iv, 347); **13**, 230; Cooke Exs. ii, No. 336. On stems; recorded **40** (v, 92) as a parasite of *Geranium*.
- **leucum** Bayliss Elliott & Stansf. in **28** (viii, 249*, 1923). On pine cones, Warwicks.
- **Magnusianum** Sacc. **40** (ix, 41, 1887); **8**, 350. On *Trientalis*, Scotland.
- **melleum** Bayliss Elliott & Stansf. in **28** (viii, 250, 1923). On pine cones, Warwicks.

- Septocylindrium pallidum** Grove in Sacc., *Syll.* iv, 224 and in 27 (xxiv, 199*, 1886); 8, 349. On *Diatrype stigma*, Worcs.
- **septatum** (Bonord.) Lindau. As *Cylindrium*: 19 (3, vii, 449, No. 954, 1861); 15, 608*; 27 (xxii, 196). As *S. Bonordenii* Sacc.: 8, 349*; 37 (1909, 376); 71 (xxviii, 149). On wood, etc.
- **viride** (Corda) Sacc. 8, 350, 1893. On wood.
- Septonema irregulare** Berk. & Br. in 19 (3, vii, 381*, No. 942, 1861); Sacc. iv, 399; 15, 481; 8, 404*; 71 (xxviii, 149). On twigs of *Pyrus*.
- **spilomeum** Berk. in 21 (2, iv, 310*, 1845); Sacc. iv, 399; 19, No. 466; 15, 481*; 8, 404; 7, 341. On wood.
- Spondylocadium atrovirens** Harz. 69 (i, 352*, 1907); 37 (1909, 16*); 23 (xvi, 31 and 125); 5, 478; 25 (xv, 517; xix, 282); 85 (xxix, 17); 71 (xl, 55). As *Phellomyces sclerotiphorus* Frank: 25 (iii, 14, 1902); 69 (i, 161). Causes Silver-scurf of potato tubers.
- **fumosum** Mart. ex Wallr. 19 (4, vii, 431*, No. 1314, 1871); 8, 420*; E. W. Mason, *Annotated Acc. List* ii, Fasc. i. On wood.
- **xylogenum** A. L. Smith in 28 (iii, 37*, 1908); Sacc. xxii, 1384. On wood, Shropshire. 'Closely related to *S. fumosum*', E. W. Mason, loc. cit.
- Stigmia Visianica** Sacc. 14 (xxi, 120, 1893); 8, 403. On leaves, Kew.

XEROSPORAE—DICTYOSPORAE

- Acrospeira asperospora** (Cooke & Massee) Wiltshire in 28 (xxi, 236*, 1938). *Stemphylium* Cooke & Massee in 14 (xvi, 11, 1887); Sacc. x, 672; 8, 430*; 33 (xvi, 86). On wall-paper and on dung of wild sheep.—Saccardo and others have placed *Acrospeira* in the Amerosporae, but Wiltshire points out that it is more properly placed in the Phaeodictyae.
- **macrosporoidea** (Berk.) Wiltshire in 28 (xxi, 236*). *Epochnium* Berk. in 19 (i, 263*, No. 131, 1838); 15, 623. *Stemphylium* Sacc. in *Syll.* iv, 519; 8, 429; 27 (lv, 136*); 115, 151. On old *Ribes*, etc.
- **mirabilis** Berk. & Br. in 91, 305*, 1857 (without formal diagnosis); gen. nov. in 19 (3, vii, 449, No. 952, 1861); Sacc. iv, 282; 15, 598*; 8, 375*; 5B, 435; 28 (ii, 17*; xxi, 233*). On chestnuts, etc.
- Alternaria Brassicae** (Berk.) Sacc. in *Syll.* iv, 546; 8, 436*; 56 (xxvii, 803); 89, 81; 79 (iii, v, ix, xi); 112, 341; 22, Bull. 79; 93, 89. *Macrosporium* Berk. in 20, 339, 1836; 15, 577; 73 (1877, t. 26); 8, 432. As *Polydesmus exitiosus* Kühn: 40 (ix, 172). On *Brassica*, etc. Berkeley's *Macrosporium Brassicae* evidently had long spores. Many authors have followed Saccardo, who erroneously considered that the species had smaller spores, i.e. his fungus was *Alternaria oleracea* Milbrath = *A. circinans* (Berk. & Curt.) Bolle.—See also *Cercospora Brassicae* (p. 89).
- **Cheiranthi** (Lib. ex Fr.) Bolle. As *Macrosporium*: ?15, 576, 1871; 13, 271; 8, 434; Mason, *Annotated Acc. List* ii, Fasc. i; 28 (xviii, 142*); Vize Exs. 138 and *Fungi Brit.* 173. On *Cheiranthus*. See *A. tenuis*.
- **cucumerina** (Ellis & Everh.) Elliott. As *A. Brassicae* var. *nigrescens* Pegl.: 80, 99, 1923; 112, 341. On *Cucumis*.
- **Dianthi** Stev. & Hall. 112, 342; 93, 118; perhaps 31 (3, lxxxii, 150). As *Macrosporium*: 80, 106, 1923; 22 (Misc. Publ. 52, p. 87). On *Dianthus*.
- **Grossulariae** Jacz. 34 (vii, 190, 1920); 33 (xxxvi, 262). From spotted apples.
- **humicola** Oudem. 102 (x, 470*, 1912); 28 (iv, 183; xix, 147); 116, 153; 34 (xv, 95). In soil.
- **maritima** Sutherland in 32 (xv, 46*, 1915); Sacc. xxv, 866. On *Laminaria*, Orkney, Ayrshire and Dorset.
- **oleracea** Milbrath. 22 (Monthly Survey, No. 10, 1934); 112, 341, 1928 as *A. circinans* (Berk. & Curt.) Bolle. On *Brassica* spp.
- **pomicola** Horne in 27 (lviii, 242, 1920); 34 (vii, 190); 22, Misc. Publ. 38. From apples.

- Alternaria Solani** (Ell. & Mart.) Sorauer. **61** (cxxxiv, 932*); **28** (xx, 114). As *Macrosporium*: **82** (v, 22 and 25, 1920); **34** (viii, 13); **112**, 340; **65** (xxx, 343); **23** (xliii, 124). On potato and tomato. See *M. Cookei*.
- **tenuis** Nees ex Wallr. **27** (L, 45, 1912); **28** (x, 113; xviii, 135; xix, 147); **79** (i, 18); **34** (xii, 29); **33** (xliii, 656; xlii, 343; xlviii, 363); **23** (xliii, 124); **93**, 41; Mason, *Annotated Acc. List* II, Fasc. i. 'Var. *Hordei*' recorded **69** (i, 370, 1907). As *Macrosporium commune* Rabenh.: **14** (xvi, 111, 1888); **8**, 431; **68** (1901, 615); **28** (i, 184); **34** (xvii, 290); **22** (Bull. 117, p. 145); Rabenh. Fungi Eur. No. 1360; Cooke Exs. II, No. 641. In error as *M. Cheiranthi*: **20**, 339, 1836; Cooke Exs. 197. *M. Cheiranthi* var. *Betae* Cooke in **15**, 576. As *Sporidesmium putrefaciens* Fuckel: **28** (xiv, 153); **79** (vii, 34); **22** (Bulls. 70 and 79). A common saprophyte or hemi-parasite. Various 'species' of *Alternaria* and *Macrosporium* belong to the '*A. tenuis* group.'
- **Tomato** (Cooke L. R. Jones in *Bull. Torrey Bot. Club*, xxiii, 353, 1896. *Macrosporium* Cooke in **14** (xii, 32), from S. Carolina; **14** (xvi, 112, 1888); **8**, 433; **5B**, 324*; **23** (iii, xliii); **56** (xix, 15; xxvi, 733; xxvii, 818*); **89**, 96; **66** (cxgviib, 7); **5**, 502; **7**, 343; **37** (1906, 242); **22** (Misc. Publs. 33 and 38); **112**, 341. On *Lycopersicum*. *A. Tomato* causes 'Nailhead Spot' in America; see Florida Bull. 332. Most or all the British records refer to saprophytic species, such as those associated with Blossom-end Rot. Massee regarded *M. Tomato*, *M. Lycopersici* Plowr. and *Gladosporium Lycopersici* Plowr. as synonyms of *M. Solani* Cooke (see *M. Cookei*).
- **Viola** Galloway & Dorsett. **56** (xxvi, 492, 1901; xxvii, 27*); **89**, 28. On *Viola*.
- Coniothecium amentacearum** Corda. **19** (2, v, 460, No. 460, 1850); **66** (1857, 548); **45** (xxiv, 159*); **15**, 827; **8**, 427; Cooke Exs. 531 and II, No. 26. On willow branches.
- **betulinum** Corda. **19**, No. 461, 1850; **15**, 820; **8**, 427; Cooke Exs. 622 and II, No. 25. On birch.
- **chomatoporum** Corda. **37** (1915, 104*); **22** (Misc. Publs. 33, 38, 52, 70, 79); **112**, 340; **65** (xxx, 338); **77** (1928-30, II, 150). On *Pyrus Malus*. Massee, **37**, thought this fungus and *Phoma Mali* Schulz & Sacc. were stages of *Diaporthe ambigua* Nits. Van der Bijl, *S. Afr. J. Sci.* xii, 649, 1915 obtained *Phoma Mali* from pure cultures of the *Coniothecium*.
- **chomatoporum** var. **variegatum** Preuss. **27** (xxvi, 201, 1886). On wood, Worcs.
- **complanatum** (Nees ex Fr.) Sacc. **28** (xxii, 4, 1938). On *Salix*, Surrey.
- **conglutinatum** Corda. **40** (ix, 40, 1887); **8**, 427; **7**, 343. On birch wood, etc.
- **effusum** Corda. **19**, No. 459, 1850; **8**, 427; **7**, 343; **71** (xxviii, 149). *Sporidesmium Lepraria* Berk. in **21** (1853, 43*); **19**, No. 750; **15**, 484; **13**, 231; Cooke Exs. 532 and II, No. 631; Vize Exs. 24. As *Lepraria nigra* Turn. & Borr., Sowerby's *Engl. Bot.* t. 2409. On wood.
- **epidermidis** Corda. **70** (1936, 417). On *Cytisus*, Ireland.
- **sphaerale** (Fr.) Keissler. **119**, 616; **28** (v, 433, 1917) as *Sclerococcum*. On lichens, Scotland and Wales.
- **viticola** Cooke & Massee in **14** (xvi, 9, 1887); Sacc. x, 669; **8**, 428*; **7**, 343. On dead *Vitis*.
- Dactylosporium brevipes** Grove in **27** (xxiv, 205*, 1886); Sacc. x, 678; **8**, 436*. On sycamore wood near Birmingham.
- Dictyosporium Boydii** A. L. Smith & Ramsb. in **28** (v, 168, 1915); Sacc. xxv, 844. On wood, Scotland.
- **elegans** Corda. **19** (2, v, 460, No. 458, 1850); **15**, 486*; **46** (iii, 65); **8**, 428*; **37** (1911, 377). On wood, etc.
- **toruloides** (Corda) Guéguen. As *Spira*: **19** (3, xv, 401, No. 1041, 1865); **15**, 479*; **13**, 230; **8**, 429*; **71** (2, vi, 27). On herbs and wood. Guéguen **117** (xxi, 98) considered *Spira* and *Dictyosporium* congeneric. Chenantais **117** (xxxv, 203) agreed, and gave several synonyms for *D. toruloides*, including *D. elegans* and *Hormiscium hysterioides*. See *Spira* below.

- Epicoccum diversisporum** Preuss. 14 (xv, 43, 1886); 8, 488; 7, 350. On reeds, etc.—Saccardo and others have placed *Epicoccum* in the *Amerosporae*, but the spores become muriform.
- **Equiseti** (Berk.) Berk. in 18, 341, 1860; 15, 560; 8, 488; 7, 350. *Uredo* Berk. in 20, 384, 1836; 19, No. 500. On old *Equisetum*.
- **granulatum** Penzig. 27 (xxiii, 169, 1885); 8, 487; 28 (xix, 147); 67 (cxviii, 154). On grasses, etc.
- **herbarum** Corda. 14 (xvii, 16, 1888); 8, 488; 7, 350. On leaves, etc.
- **maritimum** Sutherland in 32 (xv, 47*, 1916); Sacc. xxv, 985. On *Laminaria*, Orkney and Dorset.
- **micropus** Corda. 19 (4, vii, 431, No. 1313, 1871); 8, 488; 7, 350. On *Lactarius*.
- **neglectum** Desm. 19 (2, v, 466, No. 500, 1850); 15, 560*; 13, 267; 8, 488; 46 (iii, 136); 7, 350; 71 (xl, 55); Cooke Exs. ii, No. 171. On old plants.
- **purpurascens** Ehrenb. ex Wallr. 27 (xxii, 200, 1884); 8, 489*; 7, 350; 71 (xxviii, 150); 62 (xxii, 434); 116, 155. As *E. vulgare* Corda; 8, 487; 7, 350. On stems, etc.
- Fumago vagans** Pers ex Sacc.? 14 (xvi, 112, 1888); 8, 437*; 89, 162* and 216; 35 (1920, 403); 71 (xxviii, 150). On leaves.
- Macrosporium Camelliae** Cooke & Massee in 14 (xvii, 42, 1888); Sacc. x, 674; 89, 165. On *Camellia*.—Wiltshire 28 (xviii, 135) points out that *Macrosporium* and *Alternaria* are congeneric, and concludes that *Macrosporium* should be considered a *nomen ambiguum*. The species of *Macrosporium* included here, most of which are doubtful, have apparently not been transferred to *Alternaria*.
- **cladosporioides** Desm. 14 (iii, 66, 1874); 8, 431; 102 (x, 470); Vize Exs. 137; Cooke Exs. 620 and ii, No. 161. On leaves and stems.
- **concinnum** Berk. in 19 (i, vi, 435*, No. 235, 1841); Sacc. iv, 531; 15, 577*; 13, 272; 8, 432; 46 (iii, 65). On willow twigs, etc.
- **Convallariae** Fr. 14 (xvi, 112, 1888); 8, 434. On *Convallaria*.
- **Cookei** Sacc. in *Syll.* iv, 530; 31 (1905, 230); 89, 95. *M. Solani* Cooke [non Ell. & Mart.] in 14 (xii, 32, 1883), described from S. Carolina; 23 (i, 206, 1894; xii–xv); 56 (xix, p. cxxxvi); 5B; 37 (1906, 112 and 242; 1914, 145); 5, 502*; 56 (xxxvi, 620; xxxix, 595); 112, 340. On potato, probably a saprophyte. It was thought to cause leaf-curl. Massee considered *M. Tomato* to be a synonym.
- **heteronemum** Desm. 27 (iv, 116, 1866); 15, 577; 8, 432. On old *Sagittaria*.
- **ignobile** Karst. 28 (iv, 183, 1913). On *Arum*, Ayrshire.
- **laminarianum** Sutherland in 32 (xv, 45*, 1916); Sacc. xxv, 862. On *Laminaria*, Dorset and Orkney.
- **Lycopersici** Plowr. in 31 (2, xvi, 621*, 1881); Sacc. x, 676. On *Lycopersicum*. See *Alternaria Tomato*.
- **nobile** Vize apud Cooke in 14 (v, 119, 1877); Sacc. iv, 529; 73 (1877, t. 26); 8, 432*; 5B; 56 (xxvi, 650*); 89, 36*; 5, 503*; Vize Exs. 63. On *Dianthus*.
- **Pelvetiae** Sutherland in 32 (xiv, 42*, 1915); Sacc. xxv, 862. On *Pelvetia*, said to be a stage of *Pleospora Pelvetiae*.
- **ramulosum** Sacc. 14 (xvi, 111, 1888); 8, 433. On Umbelliferae.
- **Saponariae** Peck. 70 (1936, 417). On *Saponaria*, Ireland.
- **Scolopendrii** Cooke in 14 (xvi, 81, 1888); Sacc. x, 677; 73 (1877, t. 26); 8, 434. On *Scolopendrium*, Irstead.
- Mystrosporium adustum** Massee in 31 (3, xxv, 412*, 1899); 5B, 325; 56 (xxvii, 398*); 89, 75*; 23 (xv, 509); 5, 505; 79 (iv–xi); 22 (Misc. Publ. 70, Bull. 79 and Bull. 117 with literature); 31 (3, lxxxix, 55); 56 (lxi, 157*); 85 (xxxvii, 19). On bulbs of *Iris*.
- **Stemphylium** Corda. 19 (3, vii, 382, No. 949, 1861); 15, 578, the figure an error, see 73 (1877, 12); 8, 434*; 71 (xxviii, 149). On wood and stems.
- Sarcinella Questieri** (Desm.) von Höhnelt. As *Coniothecium*: 28 (ii, 15, 1903); 56 (xxvii, p. cxviii); 89, 110. On apple leaves; the bulbil stage of *Schiffnerula pulchra*.

- Septosporium atrum** Corda. 14 (xvi, 112, 1888); 8, 435. On old *Smyrniun*.
 — **bulbotrichum** Corda. 15, 579*, 1871; 48 (ii, 259); 8, 435*. On wood.
 — **elatus** Grove in 27 (L, 45*, 1912); Sacc. xxv, 863. On bark, Wales.
Speira cohaerans Preuss. Grove 27 (L, 45, 1912) renamed it *S. toruloides* var. *translucens* Grove. On bark, Warwicks. See *Dictyosporium* above.
 — **effusa** (Peck) Sacc. 27 (L, 45, 1912). On wood, Studley Castle. Grove decided that it is a variety of *S. toruloides*.
Sporodesmium antiquum Corda. 14 (xvi, 110, 1888); 8, 425. On wood.—Early mycologists usually used the spelling 'Sporidesmium'.
 — **antiquum** var. **compactum** Berk. & Br. in 19 (2, v, 459, No. 453, 1850); Sacc. iv, 500; 15, 484; 8, 425. On wood.
 — **chartarum** Berk. & Curt. 14 (xvi, 110, 1888); 8, 426; 37 (1911, 377); 35 (1913, 175); Cooke Exs. 329. On paper, etc.
 — **Cladosporii** Corda. 14 (iii, 65, 1874); 8, 426; Cooke Exs. 679. On stems, etc. Corda thought it a parasite of *Cladosporium*.
 — **lobatum** Berk. & Br. in 19 (3, xviii, 121*, No. 1146, 1866); Sacc. iv, 499; 15, 485*. On 'fir sticks, Lucknam.'
 — **melanopum** (Ach.) Berk. & Br. in 19 (2, v, 459, No. 455, 1850); Sacc. iv, 498; 15, 484; 8, 425. As *Spiloma*: *Engl. Bot.* t. 2358. On bark. Saccardo mis-spelled the epithet as 'melanopodum'.
 — **myrianum** Desm. 27 (ix, 176*, 1922); 102 (xxxii, 109). On *Ammophila*. Grove considered *Spegazzinia Ammophila* Rostr. to be the same.
 — **polymorphum** Corda. 19, No. 452, 1850; 15, 483*; 8, 426. On wood.
 — **putrefaciens** Fuckel. As *Clasterosporium*: 25 (xxvii, 22). Other references under *Alternaria tenuis*. On *Beta*.
 — **scutellare** Berk. & Br. in 19 (2, v, 459, No. 456, 1850); Sacc. iv, 499; 15, 484; 8, 425. On larch bark, Essex.
 — **Solani-variens** Vanha. 23 (xvi, 646, 1909); 5, 499; 71 (xxviii, 149). On potato leaves. A doubtful species.
 — **Triglochinis** Berk. & Br. in 19 (4, xvii, 141*, No. 1607, 1876); Sacc. iv, 506; 14 (v, 57); 13, 231; 8, 426. On *Triglochis*, Scotland.
Stemphyliopsis heterospora A. L. Smith gen. nov. in 68 (1901, 617); 28 (I, 194*); Sacc. xviii, 561. On germinating seeds, Norwood. Doubtless an albino mutant of a species of *Stemphylium*.
Stemphylium Alternariae (Cooke) Sacc. in *Syll.* iv, 523; 8, 430; 7, 343. *Sporidesmium* Cooke in 15, 483, 1871; 13, 231; Cooke Exs. 329 as *S. polymorphum* var. *chartarum*. On wall paper.—See Wiltshire 28 (xxi, 211) on *Stemphylium*.
 — **Berlesii** Oudem. 28 (xix, 147, 1935). From the air.
 — **botryosum** Wallr. 102 (x, 470); 28 (iv, 183); 116, 151; 70 (1929, 314); 28 (xxi, 212*) with some synonymy. *Myrosporium Alliorum* Berk. in 31 (1878, 192); Sacc. iv, 541; 19, No. 1982; 14 (xi, 15); 8, 435; 5B, 441; 5, 505. *Macrosporium Sarcinula* Berk. in 19 (1, 261*, No. 125, 1838); Sacc. iv, 524; 15, 576; 40 (viii, 228); 8, 431; 37 (1906, 195); Mason, *Annotated Acc.* List II, Fasc. 1; 28 (xiv, 225); 22, Bull. 79; 31 (3, lxxxix, 35); 85 (xxxiii, 19). *M. Alliorum* Cooke & Massee in 14 (xvi, 80, 1888); 8, 433. As *M. parasiticum* Thüm.: 33 (iii, 268, 1889); 22 (Misc. Publs. 23, 33, 38 and 70); 23 (xxvi, 170); 65 (xxx, 332). As '*M. commune* Rabenh.': 28 (x, 101); Cooke Exs. 641. On various plants; a stage of *Pleospora herbarum*.
 — **ericotinum** Braun & de Bary. 70 (xix, 561*, 1930); 33 (clxxxii, 343*); 24 (xx, 365). Reported in butter and on heather.
 [— **fuscum** Currey apud Cooke, nomen nudum, 14 (xvi, 111).]
 — **graminis** (Corda) Bon. 28 (x, 112, 1924); 116, 151. In apples, etc.
 — **Magnusianum** Sacc. 27 (xxiv, 205, 1886); 8, 430. On bark, etc.
 — **paxianum** (von Szabo) Lindau. *J. Oil Col. Chem. Ass.* xxii, 184, 1939. From rain-water, Sheffield. Doubtful; see 28 (xxi, 231).
 — **piriforme** (Corda) Bon. 28 (iv, 328); 116, 152. As *Sporidesmium*: 19, No. 454, 1850; 15, 484; 8, 426; 33 (xvi, 85*); 7, 343. On wood, etc.
 — **sarciniforme** (Cav.) Wiltshire in 28 (xxi, 228*, 1939). On clover, Hants.

Tetraploa aristata Berk. & Br. gen.nov. in **19** (2, v, 459*, No. 457, 1850); Sacc. iv, 516; **15**, 487*; **40** (viii, 189); **46** (v, 50); **8**, 429*; **71** (2, iv, 27); **28** (viii, 254). On grasses.

XEROSPORAE—HELICOSPORAE

Helicodendron tubulosum (Riess) Linder. As *Helicomycetes*: **14** (iii, 178*, 1875); **8**, 351*; **7**, 336. On wood.—See Linder **101** (xvi, 227–388, 1929) for descriptions and figures of this and other *Helicosporae*.

Helicoma candidum (Preuss) Linder. Recorded (as *Helicomycetes*) **115**, 98, 1937, Yorks.

— **Muelleri** Corda. **19** (2, vii, 98, No. 510, 1851); **15**, 580*; **13**, 272; **101** (xvi, 307); **73** (1877, t. 27); Vize Exs. 62. As *Helicosporium*: **8**, 439*; **7**, 343. As *Helicocoryne viridis* Corda: **19**, No. 951; **15**, 581*. As *Helicosporium viride* (Corda) Sacc.: **8**, 439; **28** (viii, 7); Cooke Exs. ii, No. 447; Vize Exs. 62. On bark and wood.

— **phaeosporum** Fres. *Helicosporium Boydii* A. L. Smith & Ramsb. in **28** (v, 168, 1915); **101** (xvi, 304*). On wood, Scotland.

Helicomycetes roseus Link ex Fr. **19**, No. 1386, 1873 (name only); **68A** (1877, 195); **27** (xxii, 197); **8**, 351; **28** (i, 66); **71** (xxviii, 149); **101** (xvi, 271). On wood.

— **scandens** Morgan. **28** (ii, 60, 1904). On wood, Savernake.

[**Helicoon ellipticum** (Peck) Morgan. *Helicosporium ramosum* (Berk. & Smith) Masee in **8**, 440*, 1893; apparently included in error, for the species is American. There is no British specimen in the Kew Herbarium.]

Helicosporium albidum Grove in **27** (xxiv, 204*, 1886); Sacc. x, 681. On *Rubus*, Warwicks.

— **lumbrioides** Sacc. **27** (xxiv, 204, 1886); **8**, 440. On oak, Sutton.

— **pulvinatum** Nees ex Fr. **18**, 326, 1860; **8**, 439; **71** (xl, 55). Var. *effusum* Berk. in **20**, 335, 1836; Sacc. iv, 557; **15**, 480. On wood. Species imperfectly known.

[— **Renneyi** nomen nudum in **14** (xvi, 113). The specimen is poor *Helicomycetes roseus*.]

— **vegetum** Nees ex Fr. **120**, 557, 1821; **19** (i, vi, 434, No. 229, 1841); **15**, 480*; **73** (1877, t. 26); **8**, 440; **101** (xvi, 278). On oak.

XEROSPORAE—STAUROSPORAE

Ceratosporium digitatum (Cooke) Sacc. in *Syll.* iv, 553; **8**, 438*; *Sporidesmium* Cooke in **14** (viii, 8, 1879). On holly branches, Norfolk.

Prismaria furcata Grove in **27** (xxii, 198*, 1884); Sacc. iv, 230; **8**, 351. On wood, Sutton.

Tetracladium Marchalianum De Wild. **28** (xvii, 82, 1932). In fresh water, London. See **100** (xxvii, 478, 1935).

Tridentaria setigera Grove in **27** (i, 16*, 1912); Sacc. xxv, 750; **28** (iii, 373). On a stem, Worcs.

Trinacrium subtile Riess. **27** (i, 15, 1912). On *Peniophora*, Hereford.

Tripodosporium Boydii A. L. Smith & Ramsb. in **28** (v, 168, 1915); Sacc. xxv, 867. On wood, Scotland.

— **elegans** Corda. **19** (2, vii, 98, No. 509, 1851; fig. with No. 1053); **15**, 580*; **73** (ii, 1871, t. 8); **13**, 272; **8**, 438*; **35** (1907, 253); Cooke Exs. 554. On wood.

— **ficinusium** Preuss. **14** (xvi, 112, 1888); **8**, 438. On branches, Bexley.

MYCELIA STERILIA (See p. 52)

Anthina flammea Fr. **20**, 329, 1836; **19**, No. 119; **18**, 338*; **15**, 549*; **13**, 264; Berk. Exs. 206. *Clavaria miniata* Purton in **55** (iii, 267*). On wood, etc.

Coccobotrys xylophilus (Fr.) Boud. & Pat. Ramsbottom, *Handbook Larger British Fungi*, p. 29, 1923. On mycelium of *Lepiota meleagris* Qué.

Ectostroma Iridis Fr. **28** (xx, 12, 1935). On *Iris*, Norfolk.

- Ozonium auricomum** Link ex Wallr. 39, t. 260, 1827; 51, 470, and several early records as *Byssus* spp. Mycelium of *Coprinus domesticus*.
- Papulaspora byssina** Hotson. 31 (3, xcvi, 463*, 1934); 79 (xii, 32); 85 (xxxv, 27; xxxix, 23; xli, 17). In mushroom beds; said to be *Myriococcum praecox* Fr., a dubious Ascomycete.
- **sepedonioides** Preuss. 19 (2, xiii, 462, No. 761, 1854); 15, 618*; 8, 293*; 28 (i, 66); 71 (xxviii, 148). On decaying substances.
- Rhacodium cellare** Pers. ex Wallr. 120, 558; 92 (ii, 34); 51, 470; 39, t. 259; 58 (ii, 212); 20, 324; 66 (ccxxv, 99). As *Zasmidium*: 18, 407; 15, 628*; 13, 289; Cooke Exs. 467 and ii, No. 644; Vize Exs. 81. *Fibrillaria vinaria* Sow. in 42, t. 432, 1815. On casks, etc. Schanderl transferred it to *Cladosporium* in *Centralbl. Bakt.* 2, xciv, 117, 1936; see also 28 (ix, 94).
- Rhizoctonia Allii** Graves ex Fr. 23 (ii, 437, 1896). On *Allium*.
- **Crocorum** DC. ex Fr. 56 (v, 23, 1850); 89, 73; 85 (1908, 1928–33); 24 (ii, 482); 64 (xlii, 58); 65 (xxx, 342); 104 (xv, 81); 112, 352, etc. As *R. violacea* Tul.: 23 (ii, 437, 1896); 28 (ii, 33); 23; 78, etc. On *Asparagus* and other hosts; stage of *Helicobasidium purpureum* (Tul.) Pat., 28 (xii, 116).
[— **Menthae** B. & Br. in 19, No. 985, 1861 is a *Tuberculina*; see 28 (xii, 137).]
[— **Monteithianum** Bennett, nomen nudum in 31 (3, xcvi, 129). On turf.]
- **Solani** Kühn. Many records on various hosts, e.g. 23 (i, 58, 1894) to date; 56, 24, 85, etc.; stage of *Corticium Solani*.
- Sclerotium bullatum** DC. ex Fr. 51, 462, 1824; 20, 224. On gourds.
- **cepivorum** Berk. in 19 (i, vi, 359, No. 168, 1841); Sacc. xiv, 1151; 71 (i, ii, v, xi); 23 (xxxiv, 49; xxxiii, 19); 56 (liii, 51); 93. Berk. Exs. 276 as '*S. Cepae*'. Records of *Sclerotinia bulborum* (Wakker) Rehm on onions, e.g. 23 (xiv, 358; xxiii, 1095; xxvi, 177); 77 (1924, 111) probably are *Sclerotium cepivorum*; see 22, Bull. 117. On *Allium*.
- **clavus** DC. is the sclerotium of *Claviceps purpurea*.
- **complanatum** Tode ex Fr. 20, 221, 1836; Berk. Exs. 72. Sclerotium of *Typhula*.
- **Delphinii** Welch. 22, Bulls. 79 and 117. On imported bulbs.
- **fungorum** Pers. ex Fr. 20, 223, 1836; Ramsbottom, *Handbook*, p. 47. Sclerotia of *Collybia tuberosa*.
- **giganteum** Rostr. Ramsbottom, *Handbook*, p. 127. Sclerotia of *Polyporus umbellatus* Fr.
- **Gladioli** Massey. 22 (Misc. Publ. 70, p. 68; Bull. 117); 112, 355; 79 (v–viii, xi); 65 (xxx, 346); 71 (xl, 55). On *Gladiolus*. The perfect stage is *Sclerotinia Gladioli*.
- [— **Hyacinthi** Guepin. 40 (x, 68, 1889). On dead scopes of *Scilla nutans*. Possibly sclerotia of *Botrytis cinerea*.]
- **lacunosum** Pers. ex Fr. 42, t. 287, 1800; Ramsbottom, *Handbook*, p. 47. Sclerotia of *Collybia racemosa*.
- **medullare** Berk. in 19 (i, 47*, No. 14, 1837); Berk. Exs. 75. Inside stems of *Pteridium*, Northants. The name is a later homonym of *S. medullare* Schwein.
- **muscorum** Pers. ex Fr. 58 (ii, 138); 20, 223. As *S. subterraneum* Tode: 39, t. 101, 1824; 51, 461. Amongst mosses.
- **mycetospora** Nees ex Fr. Ramsbottom, *Handbook*, p. 30. Sclerotia of *Lepiota cepaestipes*.
- **neglectum** Berk. in 19 (i, 205, No. 91, 1838); Berk. Exs. 165. On leaves.
- **nervale** Fr. 40 (x, 68, 1889). On leaves.
- **populinum** Pers. ex Fr. 51, 463, 1824; 20, 225. On poplar leaves.
- **pustula** DC. ex Fr. 58 (ii, 137); 20, 225. As *S. quercinum* Pers.: 120, 591, 1821; 39, t. 77; 51, 462. On leaves of oak (stage of *Sclerotinia Candolleana*) and of poplar.
- **pyrinum** Fr. 20, 224; Berk. Exs. 166. *S. fructuum* Grev. in 51, 462, 1824. On fruits.
- **quercigenum** Berk. in 20, 222, 1836; Sacc. xiv, 1148. On felled oaks.
- **rhizodes** Auersw. 28 (xvi, 308, 1922); 22, Bull. 79. On *Agrostis*.
- [— **Rolfsii** Sacc. 112, 354, 1928. On imported corms of *Arum*.]

- Sclerotium roseum** Moug. ex Fr. 19 (I, vi, 359, No. 163, 1841); 40 (x, 68); 28 (xxii, 11). In *Funcus*; stage of *Sclerotinia Curreyana*.
 — **Rubi** Carm. ex Berk. in 20, 224, 1836. On leaves of *Rubus*.
 — **salicinum** DC. ex Fr. 51, 462, 1824; 20, 225; Berk. Exs. 28. On willow leaves.
 — **scutellatum** Alb. & Schw. ex Fr. 39, t. 144, 1823; 20, 222; Ramsbottom, *Handbook*, p. 154; Berk. Exs. 27. On leaves; sclerotia of *Typhula phacorrhiza*.
 — **semen** Tode ex Fr. 39, t. 144; 20, 222; 58 (II, 137); Berk. Exs. 73. *Sphaeria Brassicae* Bolton in 111, t. 119, 1789; 42, t. 393. On stems.
 — **stellatum** Horne in 27 (LVIII, 242, 1920). Isolated from apples.
 — **truncorum** Fr. 19 (I, 571, No. 53, 1837); Ramsbottom, *Handbook*, p. 47. Sclerotia of *Collybia cirrhata*.
 — **Tuliparum** Kleb. *Cornell Agr. Exp. Sta. Mem.* 89, 1925; 31 (3, LXXIX, 271); 23 (XXXIII, 624; XLIII, 702; XLIV, 54); 56 (LIII, 51); 112, 353; 79 (XIII, 34); 22, Bulls. 79 and 117. As *Rhizoctonia*: 65 (XXX, 348); 71 (XL, 55). On *Tulipa*, etc.
 — **varium** Pers. ex Fr. 20, 223, 1836. On stored vegetables; sclerotia of *Sclerotinia sclerotiorum*.
Xylostroma giganteum Tode ex Sacc.? 42, t. 358, 1802; Ramsbottom, *Handbook*, p. 129. Sheets of mycelium of *Polyporus betulinus*.

DOUBTFUL AND EXCLUDED GENERA

Excluded species in accepted genera are indicated above by square brackets. Both the genera and species below are doubtful or excluded Hyphomycetes.

- Acalyptospora nervisequia** Desm. 19, No. 1043; 15, 488*. Glandular hairs; see 14 (I, 43).
Alliospora Sapucayae Pim gen.nov. in 27 (xxi, 234, 1883) and in 71 (2, IV, 27, 1883); 28 (I, 66). On *Sapucaya* nut, Ireland. This was apparently an *Aspergillus*.
Asterophora agaricicola Corda. 8, 326*, etc. Chlamydospores of *Nyctalis asterophora*.
Blastotrichum puccinioides Preuss = *Mycogone puccinioides* (Preuss) Sacc. A 'chlamydosporous' state of *Hypomyces ochraceus* (see 28 (xxi, 273*)); the conidial state is entered above as *Verticillium agaricinum*. The spores of *Blastotrichum* are aleuriospores, and some will consider this state 'higher' than the *Verticillium*.
Bolacotricha grisea Berk. & Br. gen.nov. in 19 (2, VII, 97*, No. 506, 1851). A *Chaetomium*: see 28 (xxiv, 133).
Cephalotrichum curtum Berk. in 19 (I, VI, 432*, No. 222, 1841); Sacc. IV, 275; 15, 569*; 8, 371*. Von Höhnelt, *Centralbl. Bakt.* 2, LX, 9, 1924, claimed that the type is a *Haplographium*.
Epidochium atrovirens (Fr.) Fr. 14 (xvii, 16, 1888); 8, 489*. On branches. This is *Tremella atrovirens* (Fr.) Sacc.
 — **Xylariae** von Höhnelt. 35 (1936, 275). On *Xylaria*, Yorks.
Fusicolla Betae Bon. 14 (xvii, 13, 1888). On beet-root. Probably *Fusarium* sp.
Fusoma tenue Grove in 27 (I, 16*, 1912). On a stem, Worcs. Placed in *Die Fusarien* as a synonym of *Fusarium culmorum*.
 — **triseptatum** Sacc. Listed 71 (XLII, 53, 1931). According to Wollenweber, perhaps a *Septogloeum*.
Himantia candida Pers ex Chev. 39, t. 228, 1823; 92 (II, 35); 51, 470; 58 (II, 213). *Fibrillaria stellata* Sow. in 42, t. 387, 1803. The mycelium of Hymenomyces.
Microstroma album (Desm.) Sacc. 8, 276*; 89, 207*. As *Fusisporium*: 19 (I, VI, 438, No. 248, 1841); Berk. Exs. 321. As *Fusidium*: 15, 609; 13, 283; Vize Exs. 141. On oak leaves. *Microstroma* is probably not a Hyphomycete.

- Milowia amethystina** Massee in 37 (1907, 243*). On wood, Kew. *Milowia* Massee was based on *Thielaviopsis basicola*.
- Mycelium radialis nigrostrigosum** Hatch and similar names are used for mycorrhizal fungi, e.g. 76 (VIII, IX), *J. Ecol.* IX, 254, 1922.
- Myxotrichum** spp. were formerly considered Hyphomycetes, e.g. by Massee 8. British records are included in the Pyrenomycetes.
- Oedemium atrum** Corda ex Fr. An uncertain fungus recorded 19, No. 501; 15, 569*; 8, 376*, etc. On wood.
- Pachnocybe ferruginea** (Sow. ex Fr.) Berk. in 20, 334, 1836; *Mucor* Sow. in 42, t. 378. On worked wood. Specimens agreeing with Berkeley's were recently found on boards in a dwelling, England. *Pachnocybe* Berk. is uncertain; the first of the five species is *Graphium subulatum*.
- Paepalopsis Irmischiae** Kühn. 28 (v, 290). In flowers of *Primula*, Kent; said to be conidia of *Tuburcinia primulicola*.
- Pericystis alvei** Betts in 27 (XXVI, 798*, 1912). In beehives. This may be a Phycmycete.
- Periola tomentosa** Fr. 18, 342 and 356; 15, 622; 8, 472*. British records, at least, apparently based on specimens of *Fusarium*.
- Psilonia densa** Berk. in 20, 353, 1836. On rotten potatoes, Northants.
- **nivea** Fr. is of insect origin: see 19, No. 1319; 8, 474.
- Rhizomorpha** spp. were listed by early mycologists, and included *R. divergens* Grev., *R. farinacea* Grev., *R. medullaris* J. S. Smith, *R. subterranea* Pers., and *R. subcorticalis* Pers. The last two names refer to the rhizomorphs of *Armillaria mellea*.
- Sphaeridium vitellinum** Fres. 40 (x, 282, 1890). On beech leaves, Scotland.

HOST INDEX

Only vascular plants and the cultivated mushroom are included. Saprophytes and doubtful parasites are usually omitted. No effort is made to give the full host range of plurivorous parasites such as *Fusarium*, *Botrytis*, *Verticillium*, *Sclerotium*, etc.

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INDEX TO GENERA AND SPECIES OF HYPHOMYCETES

A numeral in *italics* refers to a name entered as a synonym or otherwise not accepted. The authors for genera are given here, for species in preceding pages. Pre-Friesian authorities are accepted for synonyms (e.g. *Dematium griseum* Pers., *Polyactis* Link). In ordinary citations of accepted genera and species the pre-Friesian authorities may be omitted, e.g. '*Polythrincium* Fr.' in place of '*Polythrincium* Kunze & Schm. ex Fr.'; 'apud' and 'in' and the author following may also be omitted, e.g. we cite '*Macrosporium nobile* Vize apud Cooke' so as to continue with the place of publication; the fungus is *M. nobile* Vize.

A specific epithet is entered but once, under the generic name here accepted, i.e. nomenclatural synonyms are not included. Thus if one wishes to look up '*aureus*, *Aspergillus*' he may not recognize it in this Index; but he may assume that it can be traced as '*aurea*', '*aureum*' or '*aureus*', and will find it as *Nematogonium aureum*.

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ADDENDUM TO MYCELIA STERILIA

Cenococcum geophilum Fr. 20, 307; 18, 304; 15, 376. *Lycoperdon graniforme* Sow. in 42, t. 270, 1800. In humus. See ref. in *Rev. Appl. Myc.* v, 316.

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